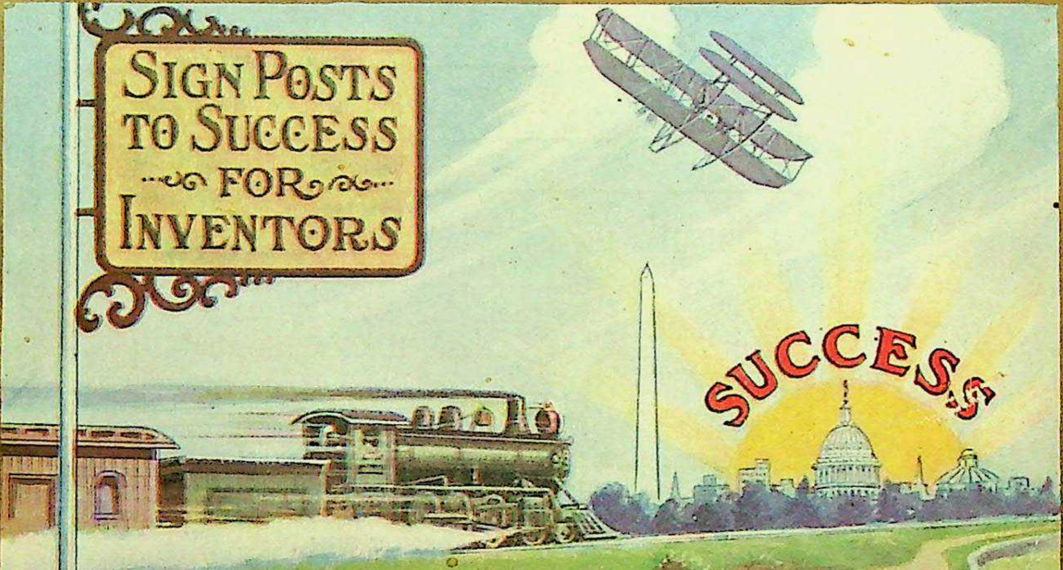
INVENTIONS NEEDED



RANDOLPH & CO.

PATENT ATTORNEYS WASHINGTON, D.C.

THE WORLD BEGS FOR INVENTIONS

THE domestic labor problem, always with us, offers untold opportunity for the profitable development of anything that will diminish the labor or the vexation of the housekeeper.—Edward Bruce Moore, Commissioner of Patents.

❧

Finally, let it be said hardly any piece of machinery now manufactured is more than ten per cent perfect.—Thomas A. Edison.

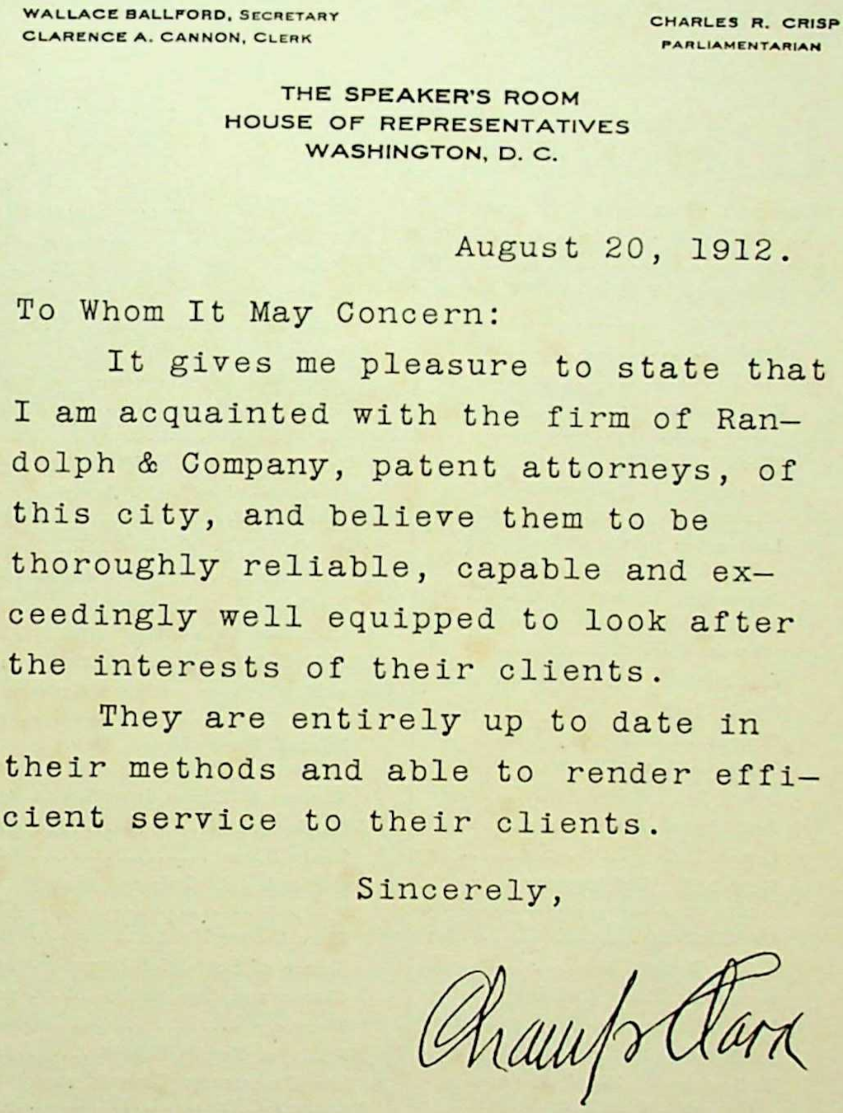
❧

The prevailing scarcity of both common and skilled labor in the precious metal mining districts of this country and of Mexico furnishes a wide field of opportunity for inventors in mining and ore-milling operation. —Cortlandt E. Palmer, Mining Expert.

❧

What the world is waiting for in the way of light is simply a cheaper light.—Peter Cooper Hewitt.

The riches of the earth are won by the brains of man.



WALLACE BALLFORD, SECRETARY
CLARENCE A. CANNON, CLERK

CHARLES R. CRISP
PARLIAMENTARIAN

THE SPEAKER'S ROOM
HOUSE OF REPRESENTATIVES
WASHINGTON, D. C.

August 20, 1912.

To Whom It May Concern:

It gives me pleasure to state that I am acquainted with the firm of Randolph & Company, patent attorneys, of this city, and believe them to be thoroughly reliable, capable and exceedingly well equipped to look after the interests of their clients.

They are entirely up to date in their methods and able to render efficient service to their clients.

Sincerely,

Champ Clark

Endorsement by the Hon. Champ Clark, Speaker of the House of Representatives.

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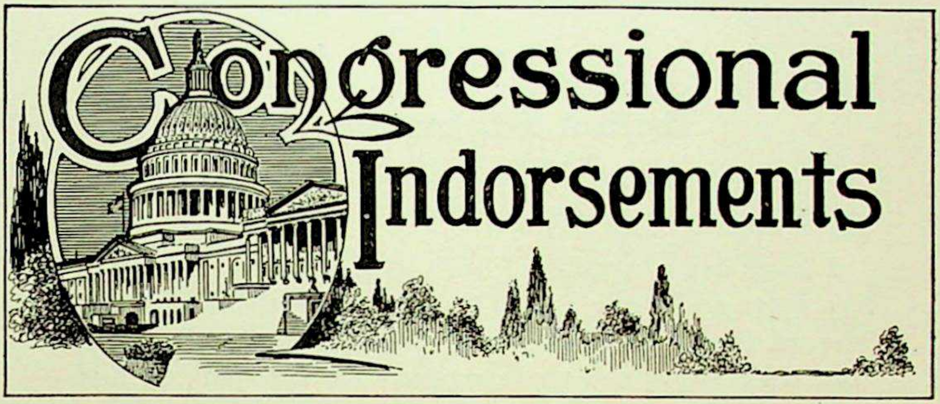


Congressional Indorsements

United States Senate

June 13, 1913.

To Whom It May Concern:

Randolph & Co., patent attorneys of Washington, who do a general patent business, and make a specialty of patent selling, have been in business in Washington for many years. They are entirely trustworthy and efficient, and I commend them to anyone in need of the services of patent attorneys in Washington.

Yours very truly,

WM. HUGHES.

United States Senate
WASHINGTON, D. C.

To Whom It May Concern:

I have been in public life in Washington for twenty-five years and while I have had no personal dealings with Messrs. Randolph & Company, Patent Attorneys, I know that they enjoy a high reputation for integrity in business and for exceptional ability in their profession.

MARK A. SMITH.

United States Senate
WASHINGTON, D. C.

June 27, 1913.

To Whom It May Concern:

Messrs. Randolph & Co., patent attorneys of this city, are well known and stand very high in their profession. They are capable and have long enjoyed an enviable reputation throughout the United States and foreign countries for the successful manner in which they prosecute all patent matters entrusted to their care.

Very truly,
ALBERT B. FALL.

House of Representatives
WASHINGTON

December 20, 1912.

To Whom It May Concern:

It pleases me to say that the firm of attorneys of Randolph & Company, Patent Attorneys, are competent, reliable, painstaking, energetic and industrious.

Their energy and vigilance as attorneys fits them to properly care for Patent Office business in whatsoever form it may come up.

I am especially pleased to commend them most highly to any one needing the assistance of patent attorneys.

Very sincerely yours,

SCOTT FERRIS.

House of Representatives, U. S.
WASHINGTON, D. C.

June 12, 1913.

My belief is that those interested in patents save both time and money by getting in touch at once with a thoroughly responsible patent attorney or firm of attorneys.

It is a pleasure to add my endorsement to that of others of Randolph & Co., of Washington, D. C.

Yours sincerely,

ALBERT JOHNSON.

Committee on the Judiciary
HOUSE OF REPRESENTATIVES, U. S.
WASHINGTON, D. C.

December 20, 1912.

To Whom It May Concern:

Messrs. Randolph & Company, of Washington, D. C., are thoroughly reliable patent attorneys and it gives me pleasure to recommend them for any business which may be placed in their hands. They are thoroughly reliable and I am sure that any matters which may be given to them will have the best attention.

Yours very truly,
JNO. W. DAVIS.

House of Representatives
WASHINGTON

December 19, 1912.

To Those Who May Be Interested:

Randolph & Company, Patent Attorneys of Washington, D. C., are efficient and painstaking in serving those who have inventions. I take pleasure in commending them to whosoever may desire their services, and am joined in this recommendation by a great number of my colleagues and influential friends in Washington.

A. W. RUCKER,
M. C.,
1st Dist. Colorado.

House of Representatives, U. S.
WASHINGTON, D. C.

December 19, 1912.

To Whom It May Concern:

Randolph & Company, Patent Attorneys of Washington, are reliable patent selling agents and the work they are doing in a strictly professional manner is most beneficial to the many inventors whose inventions are worthy of patent. After a satisfactory investigation of their methods, I recommend them as entirely worthy of confidence.

PATRICK F. GILL,
M. C.,
11th District of Missouri.

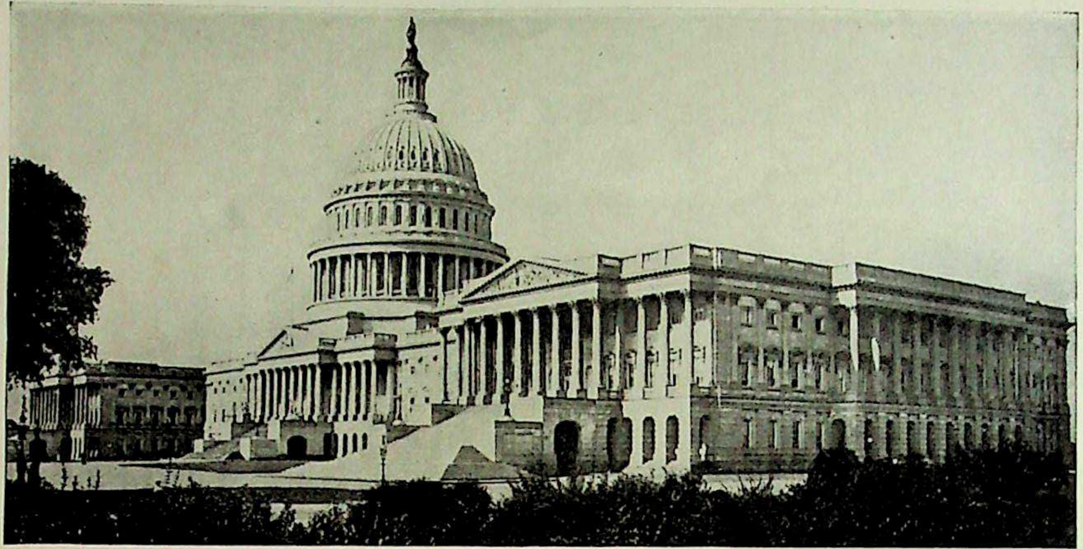
Committee on the District of Columbia
HOUSE OF REPRESENTATIVES, U. S.
WASHINGTON, D. C.

December 19, 1912.

To Whom It May Concern:

I take pleasure in saying that I know Messrs. Randolph & Co., Patent Attorneys, by reputation. They are known to be reputable and reliable.

Very truly,
JOHN H. ROTHERMEL,
13th District of Pennsylvania.



The Capitol

House of Representatives, U. S.
WASHINGTON, D. C.

December 19, 1912.

To Whom It May Concern:

Randolph & Company, Patent Attorneys of Washington, are known to me to be reliable and efficient, and I recommend them to any one desiring their services.

Yours very truly,

E. L. TAYLOR, JR.,
12th Cong. Dist. Ohio.

House of Representatives, U. S.
WASHINGTON, D. C.

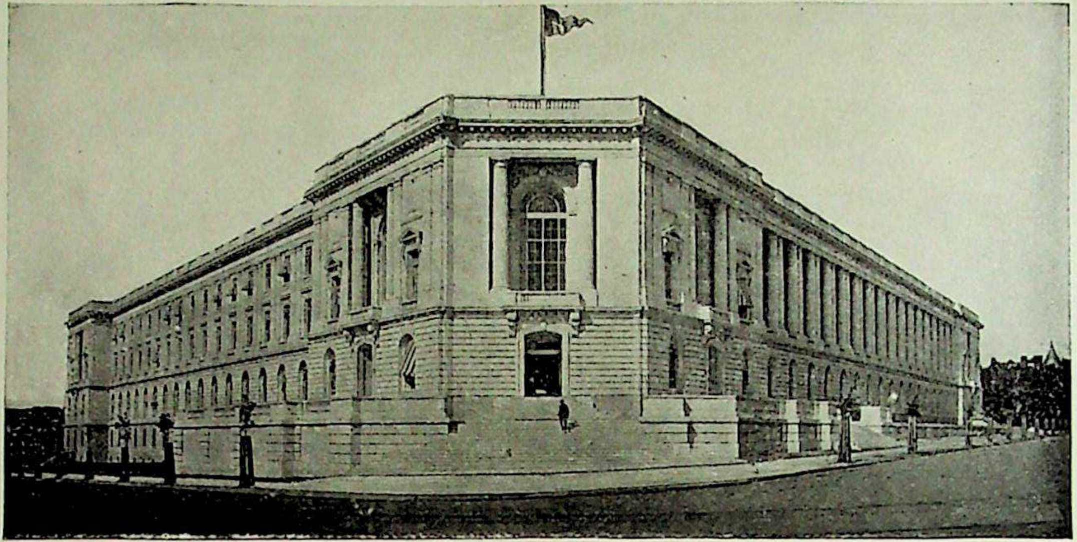
Washington, D. C.. December 19, 1912.

To Whom It May Concern.

The patent firm of Randolph & Co., of Washington, D. C., is reliable in every particular and I gladly recommend it to the consideration of those wishing work performed before the U. S. Patent Office or other channels.

Yours very truly,

STEPHEN G. PORTER,
29th Pennsylvania District.



The Senate Office Building

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HOUSE OF REPRESENTATIVES U. S.
WASHINGTON, D. C.

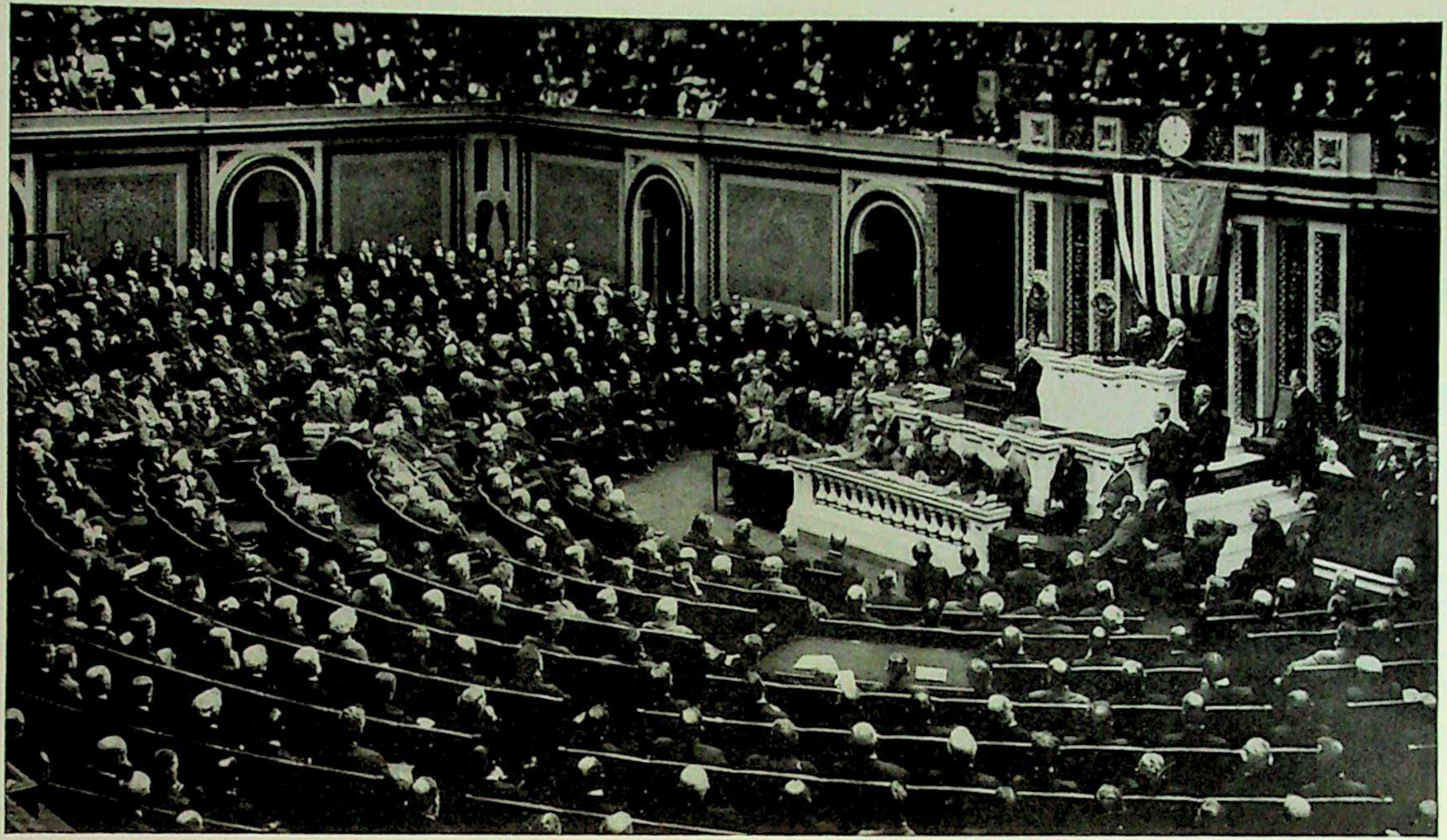
August 5, 1913

TO WHOM IT MAY CONCERN:

Randolph & Co., of Washington, D. C., are patent attorneys who enjoy a high reputation for efficiency and faithfulness of performance. They have been doing business here for a number of years. It gives me pleasure to commend them to any persons who may have business before the Patent Office. They make a specialty of assisting inventors in disposing of their patents advantageously.

Very truly,

William F. Murray



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House of Representatives Being Addressed by President Wilson.

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L. E. FRENCH, CLERK.

House of Representatives U. S.
Committee on
Expenditures in the Department of Justice,
Washington, D. C.

August 5th 1913.

TO WHOM IT MAY CONCERN:

It gives me pleasure to state that Randolph and Company, of Washington, D. C., are amongst the best and most reputable attorneys in this city. This firm has been doing business in Washington for quite a number of years; I know that they will discharge intelligently and satisfactorily any case which may be entrusted to them.

Very truly yours,

R F Broussard

M. C. and Senator-elect
from Louisiana.

Committee on the Judiciary
HOUSE OF REPRESENTATIVES, U. S.
WASHINGTON, D. C.

December 19, 1912.

Randolph & Company, Patent Attorneys of Washington, D. C., are in good standing and I hereby recommend them to the consideration of any parties who may desire to secure work done before the Patent Office or in any other direction.

H. GARLAND DUPRE,
2d District of Louisiana.

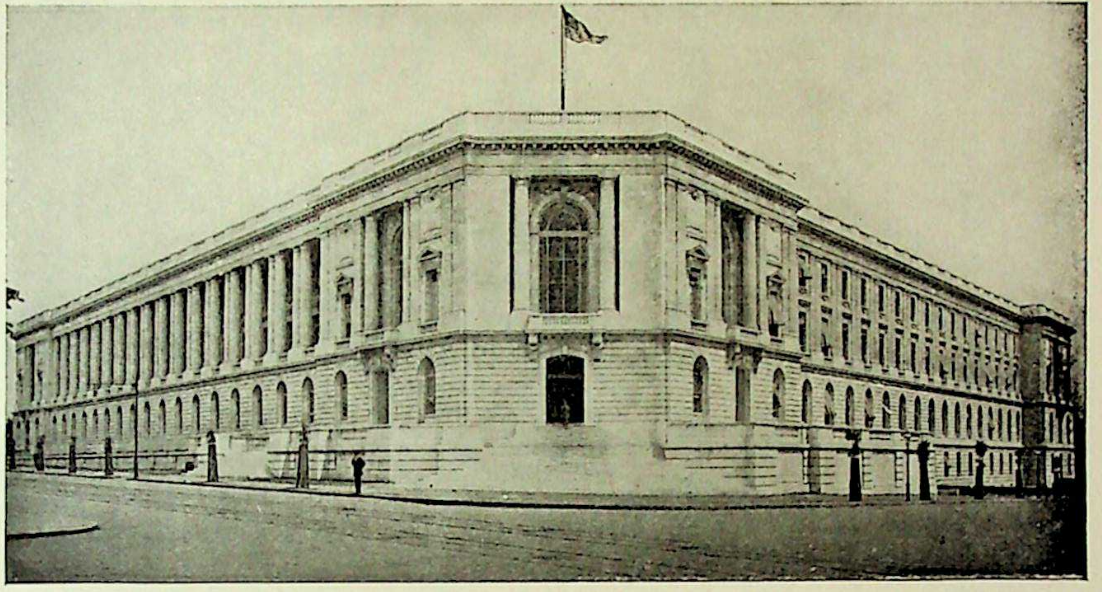
House of Representatives
WASHINGTON, D. C.

December 19, 1912.

To Whom It May Concern:

I heartily recommend the patent firm of Randolph & Company, of Washington, D. C. I have known the members for some years and regard them as absolutely reliable in every respect. Anyone desiring the services of a reputable firm should have no hesitancy in applying to this firm for work to be done before the Patent Office or other fields.

Very truly yours,
A. J. BARCHFELD,
32d Pennsylvania District.



The House of Representatives Office Building

House of Representatives, U. S.
COMMITTEE ON PRINTING
WASHINGTON, D. C.

December 19, 1912.

The firm of Randolph & Company, doing a patent business in the city of Washington, D. C., is entitled to the consideration of those who are desirous of securing recognition before the U. S. Patent Office, and I heartily recommend this firm to the attention of the public.

Very truly yours,
B. K. FOCHT,
17th Pennsylvania District.

House of Representatives
WASHINGTON

January 3, 1913.

To Whom It May Concern:

Randolph & Company, patent attorneys of Washington, are capable of taking care of any kind of patent business. They are qualified to handle not only patent cases, but to assist patentees in the sale of their patents. I commend them to any one desiring their services.

E. W. TOWNSEND.

House of Representatives

WASHINGTON

To Whom It May Concern:

Those who may have business to transact before the U. S. Patent Office will find the firm of Randolph & Company, of Washington, D. C., energetic and competent in every particular. Very truly yours,

W. B. McKINLEY,
19th Illinois District.

House of Representatives, U. S.

COMMITTEE ON ENROLLED BILLS
WASHINGTON, D. C.

January 3, 1913.

To Whom It May Concern.

The firm of Randolph & Co., patent attorneys of Washington, are capable, industrious and painstaking. I commend them to any one desiring their services as patent attorneys or as sales agents for patents. They are well qualified for any work in the way of patents.

BEN CRAVENS.

House of Representatives, U. S.

COMMITTEE ON EXPENDITURES IN THE INTERIOR DEPARTMENT
WASHINGTON, D. C.

January 3, 1913.

To Whom It May Concern:

The firm of Randolph & Company, patent attorneys, of Washington, D. C., are thoroughly competent and fully equipped to handle the business of those who are seeking to have their ideas exploited to the country through the U. S. Patent Office. I commend them to any one desiring efficient work in every particular.

Very truly yours,

D. F. LAFEAN.

House of Representatives, U. S.

WASHINGTON, D. C.

Washington, D. C., January 6, 1913.

To Whom It May Concern:

Randolph & Co. are known to me to be capable, painstaking, efficient patent attorneys and I take pleasure in commending them to anybody desiring service in this line. Yours truly, VICTOR MURDOCK,

8th District of Kansas.

House of Representatives

WASHINGTON

January 6, 1913.

To Whom It May Concern:

It gives me pleasure to commend to my friends or any one desiring the services of patent attorneys in Washington the firm of Randolph & Co., of this city. Randolph & Co. are entirely worthy of the confidence of inventors seeking patents for their inventions and are capable and painstaking in their work.

E. F. KINKEAD,
9th Dist. of New Jersey.

House of Representatives

COMMITTEE ON INVALID PENSIONS
WASHINGTON

January 3, 1913.

To Whom It May Concern:

The firm of Randolph & Company, of Washington, D. C., doing a patent business, are thoroughly reliable, energetic and painstaking in every particular. It can be depended upon to give strict attention to the business of those who are in need of service before the U. S. Patent Office. Very truly yours, J. N. LANGHAM.

House of Representatives

COMMITTEE ON ELECTIONS NO. 1
WASHINGTON, D. C.

January 15, 1913.

To Whom It May Concern:

I am pleased to commend to any one desiring the services of patent attorneys in Washington the firm of Randolph & Co., who are fully capable of taking care of the interests of inventors who may entrust their business to them. They make a specialty of assisting inventors in disposing of their patents.

Timothy T. Ansberry,
M. C. 5th Dist. Ohio.

House of Representatives

WASHINGTON, D. C.

January 15, 1913.

To Whom It May Concern:

I have had occasion to inquire into the reputation and standing of Randolph & Company, patent attorneys, with offices at No. 618 F Street N.W., Washington, D. C., and it gives me pleasure to state that this firm sustains the reputation of being thoroughly reliable, thoroughly responsible, painstaking and efficient. I have no hesitancy in recommending Randolph & Company.

Respectfully,
Joseph Taggart,
M. C. 2d Kansas District.

House of Representatives

WASHINGTON, D. C.

January 16, 1913.

To Whom It May Concern:

It is a pleasure for me to commend Messrs. Randolph & Co., patent attorneys, of Washington, to those desiring the services of attorney along this special line, as being competent, painstaking and attentive to the interests of their clients.

Yours truly,
C. E. Pickett.

House of Representatives, U. S.
COMMITTEE ON NAVAL AFFAIRS
WASHINGTON, D. C.

January 14, 1913.

To Whom It May Concern:

The firm of Randolph & Co., Patent Attorneys, of Washington, D. C., are careful and painstaking in every particular. They are equipped in every manner to look after the interests of those who may have business before the U. S. Patent Office, and I heartily endorse them to the consideration of persons wishing to get their inventive ideas before the public.

Very truly,

Arthur L. Bates,
M. C. 25th Dist. of Pennsylvania.

House of Representatives, U. S.
WASHINGTON, D. C.

January 14, 1913.

To Whom It May Concern:

The firm of Randolph & Co., Patent Attorneys, of Washington, D. C., are reliable and painstaking in every particular. Those wishing work done before the U. S. Patent Office will find this firm fully equipped in every particular to handle such business.

Very truly yours,

Charles Matthews.

COMMITTEE ON AGRICULTURE
HOUSE OF REPRESENTATIVES, U. S.
WASHINGTON, D. C.

April 22, 1913.

To Whom It May Concern:

It is with pleasure that I recommend to any of my friends having the need of the services of a Patent Attorney in Washington, the firm of Randolph & Company. The members of this Firm have had wide experience, they are thoroughly reliable and they are surrounded by experts in all of the Departments of their offices. They are as well qualified to care for the interest of clients as any attorneys I know.

Jas. T. McDermott.

House of Representatives, U. S.
WASHINGTON, D. C.

March 5, 1913.

Believing as I do that Randolph & Co., of Washington, D. C., are men of integrity and that they thoroughly understand all the branches of the business of the Patent Office, I take pleasure in commending them to any of my friends who may need the services of patent attorneys.

CHAS. F. BOOHER,
4th Dist. Mo.

House of Representatives, U. S.
WASHINGTON, D. C.

April 22, 1913.

TO WHOM IT MAY CONCERN:

To those requiring the services and advice of competent patent attorneys I recommend with pleasure the firm of Randolph & Co., of Washington, D. C. They are thoroughly reliable and are experts in their profession. I know of none better qualified to render efficient service.

ADDISON T. SMITH.

House of Representatives, U. S.
WASHINGTON, D. C.

January 29, 1913.

TO WHOM IT MAY CONCERN:

This is to certify that for some time last past, I have personally known and dealt with the firm of Randolph & Co., Patent Attorneys, of Washington, D. C. This firm of attorneys is efficient, painstaking and experienced in their line of business, and I can safely recommend them to any and all of my friends who have business in the line of patent rights, as any business entrusted to them will receive their most careful attention.

Yours truly,

M. E. BURKE,
M. C. 2d Dist. of Wisconsin.

House of Representatives

Washington

To Whom It May Concern:

The firm of Randolph & Co., Patent Attorneys of Washington, D. C., come to me so highly recommended for efficient work and fair treatment of patrons, it is with confidence and pleasure that I recommend them to my friends who are seeking advice as to inventions and patents. Their plan to make patents known to possible purchasers through the medium of a Sales Department and by advertisement is something new and appears most commendable.

Yours very truly,

Dic: M. A. D. STANLEY.

House of Representatives

Washington

To Whom It May Concern:

Just as the world is benefited by a new discovery or invention just so is the man who makes a discovery or invention benefited if he secures that protection which the government of the United States offers but which so often is missed by either carelessness or the inattention of inexperienced patent attorneys. To any man who seeks the government's protection in such matters I take pleasure in recommending the reliable firm of Randolph & Co., whom I am convinced will give to even the smallest inventor their best attention and secure every protection desired.

Yours very truly,

R. E. LEE.

HOUSE OF REPRESENTATIVES
WASHINGTON

June 27, 1913.

To Whom It May Concern:

The firm of Randolph & Co., patent attorneys, of Washington, D. C., have long enjoyed a reputation for efficiency and reliability. They make a specialty of selling patents, and do a general patent business. I take pleasure in commending them to any persons who may have business before the Patent Office.

Very truly,

LUTHER W. MOTT,
M. C.

HOUSE OF REPRESENTATIVES U. S.
WASHINGTON, D. C.

June 23, 1913.

To Whom It May Concern:

I take pleasure in commending the firm of Randolph & Co., of the City of Washington, as patent attorneys who are in every way qualified to care for the interests of those who have business before the Patent Office. I know of no firm better equipped to care for the business of inventors.

ROBT. H. GITTENS.

HOUSE OF REPRESENTATIVES
WASHINGTON

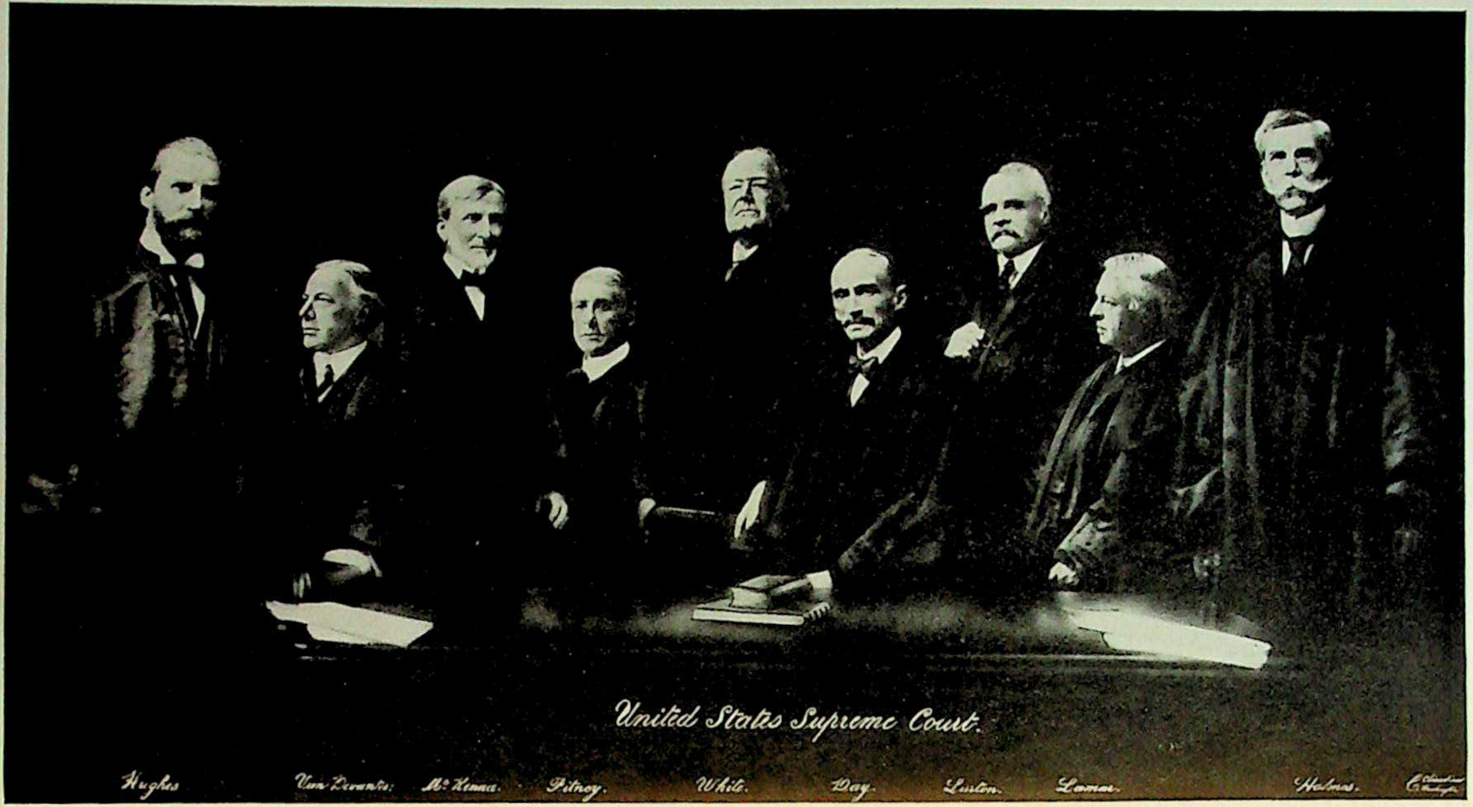
June 20, 1913.

To Whom It May Concern:

The firm of Randolph & Co, Patent Attorneys of this city, are reliable and any business entrusted to them, in my judgment, will be given careful consideration.

Yours very truly,

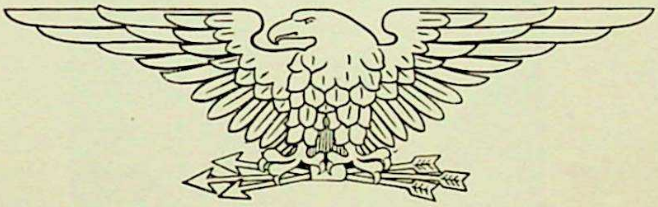
M. D. FOSTER.



United States Supreme Court.

INVENTIONS NEEDED

Sign Posts to Success For Inventors



L. F. RANDOLPH & CO., INC.
ATTORNEYS AND COUNSELLORS AT LAW
Experts in Patents, Trade-Marks and Copyrights
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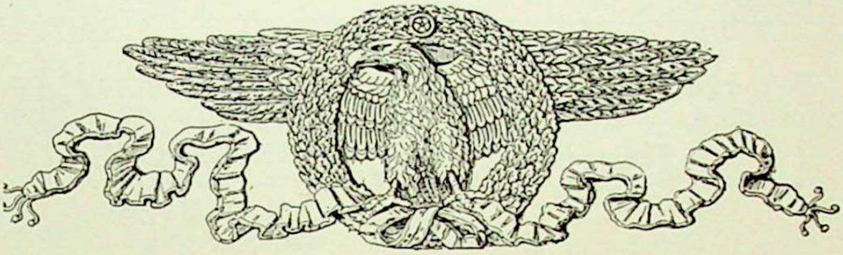
ROBERT FULTON



INVENTORS who have succeeded—those who have made money and benefited the world—have devised one of two things, either the accomplishing of some work by a cheaper method than was ever known before, or the entertainment of the public by some novelty or machine for which the public was willing to pay.

Remember always—you whose head teems with ideas of new machinery or hitherto unknown devices of any sort—learn this:

To be successful, you must be useful, and in this era of lightning-like mechanical and industrial development nothing is considered useful unless it economizes. For the work of the world, you must offer in your invention something which contains that economy—something which accomplishes its end more quickly, more thoroughly or by the employment of a cheaper device than any known to man in the past. The prime object of invention in the useful sphere of life is to abolish a waste of power, a superfluity of labor or the throwing away of any material or product.

In the sphere of amusing the public there is another element which can be taken into consideration. If you have a plaything, it matters not whether it be a new and marvelous kind of mechanical doll or an automobile capable of more speed than any other machine yet produced, you may rely to some extent on the taste of the public being so attracted that it is willing to pay a higher price than is now the rule either for the doll or for the automobile.

But, even in this field, the subject of utility must be considered, for recreation is, after all, a business of the world, and you must be sure that the novelty of your design will be supplemented by the certainty of its working so satisfactorily that it can be depended upon to do its work with regularity and thoroughness.

When all is said and done, it comes back to the same proposition:

Remember every minute the question of utility—never forget that utility is economy. The machine which did its work yesterday with the help of three men is discarded today for the new machine which will do the same work with the aid of two men.

Invention is the short cut to results.

If your idea does not furnish this device, if it does not contain this economy, it will be thrown into the scrap heap by the public instantaneously. It makes no difference whether it displays an ingenuity surpassing that of Edison or a genius triumphant over that of Bell. If it does not offer the world utility, it will serve no purpose other than to stand, unbought and unused, as empty flattery of what your thoughts have produced. No useful invention should ever go begging long.

In everything you devise or fashion or dream of, keep in your mind every moment these questions:

Will it save money? Will it save labor? Will it save material?

Answer any of these queries in the affirmative, and you will have fame and fortune within your reach.

Be useful and you will be rich.

This is the whole secret of why inventors succeed.

If you consider always how you can promote the efficiency of the world's work and add to the utility of any device, you will save yourself and your brain as well.

Knowledge of the conditions you have to meet, of the exact improvement needed, and of the probable demand for your invention can not be overestimated.

There is among the records of the Patent Office a long roll of disappointment and despair. It is the record of those men who, blessed with a high order of mechanical and inventive ability, failed to realize that they promoted no economy or put forth something for which there was absolutely no demand.

To write yourself down on such a roll is no longer necessary. The world, having obtained in the past few years so much of what it needs through useful inventions, stands ready now to tell you many of the things as yet uninvented but greatly needed. Study what these are, and you can not fail to confine your ingenuity and your talent to the right path—the path that leads to usefulness and success.

For the benefit of its old clients and for the information of those who are thinking of seeking its advice and cooperation, not only in securing a patent but also in the bigger task of taking it direct to its market, the firm of Randolph & Company has collected and herewith sets forth some of the many inventions which, if you can produce them, may win for you the success and recognition which every inventor desires.

PAN AMERICAN UNION

INTERNATIONAL BUREAU OF AMERICAN REPUBLICS

To Whom It May Concern:

I have pleasure in stating that I am acquainted with the firm of Randolph & Company, Patent Attorneys, of Washington, D. C., and know that they carry on a large and extensive practice both in the United States and foreign lands. They have a reputation for efficiency, ability and achievement which should commend them to the attention of all those who are interested in patent matters.

Yours respectfully,

JOHN BARRETT.

INVENTIONS DEMANDED BY THE WORLD TODAY

SPECIFIC OPPORTUNITIES FOR YOU TO MAKE MONEY BY PROMOTING UTILITY AND ECONOMY

FUEL

THE development of the coal deposits in Alaska and China will probably uncover the last of the great sources of coal supply. New oil fields may be found, but the world, except in a few not extensive regions, has been pretty well prospected for oil. We can see a time coming when the world will be facing the consequences of a steady diminution of its fuel supply. The situation must be met in advance by invention and discovery, and it is altogether likely that it will be. People who out of their great wisdom (and a desire for attorney's fees) tell the inventor in detail what to invent, have given inventors a false, or at least mistaken, lead on the fuel question. The solution is not likely to be found in any "fuel compound." It may be rash to predict that no "fuel compound" containing neither coal nor any of the hydrocarbon oils will ever be invented or discovered, but it is by no means probable.

The progress of electrical science and invention, of which Edison says that we are standing merely on the edge, may assist materially in the solution of the question. The discovery of natural forces now unknown may help to answer it, as the discovery of the Hertzian waves and their laws, or a part of them, brought about wireless telegraphy. It is probably in such directions that most is to be hoped for.

These suggestions are directed to the inventor who seeks profit from his work, the more immediate the better. The broadest lines of discovery are not for him. They are for the scientist who seeks his reward in achievement and not in cash. The discovery of a new law of nature would not be patentable. The discoverer could protect only mechanisms and processes based upon it; in other words, only its applications, so far as he could make them.

The best field for the inventor, in this connection, is in fuel economy, in conservation of heat produced, in its more economical and effective application, and generally in getting better results from it. In these directions there is still a vast field open to invention, holding out to the inventor almost innumerable possibilities of profit.

CONVERSION OF HEAT INTO POWER

From 85 to 93 per cent of heat energy developed by the use of fuel is lost in the conversion of heat into power, with a corresponding waste of fuel. Any invention that reduces this enormous waste, even in a slight degree, will find a world-wide market.

It is believed by such authorities as Thomas A. Edison that we shall see the time when the electric current will be produced directly from heat. Inventors all over the world are working on methods and apparatus intended to produce this result. But minor and less radical inventions which economize heat energy, no matter where in the combination of engine and boiler they may be applied, from the fire box to the exhaust, are worth money.

COMBUSTION

A varying but always large percentage of fuel used is wasted, not being actually consumed at all, or consumed at the point where the heat generated is not effective for the desired purpose. A great deal has been done in this direction, as witness the difference in fuel economy between the iron furnaces of fifty years ago and those of today. A very great deal yet remains to be done before anything approaching an ideal condition is reached.

All this means money, not to one inventor in one special line, but to many inventors in the various industrial lines in which there is a large use of fuel for generating heat.

One of the main things to be aimed at is complete combustion of the fuel at the point where it will get the best practical result.

SMOKE

Smoke means dirt, discomfort and injury to health, spread usually over an area largely occupied by people who are not directly benefited by the industries which create it. It is an unmitigated nuisance, defiling and defacing cities and towns throughout the whole soft coal consuming region of the country, which otherwise could, and in many instances would, be kept reasonably clean. It is idle to pass "soft coal" or "smoke" ordinances, if they are not enforced, and they can not be made enforcible without the inventor's aid. It is only a question of time when soft coal must be used on all railroads and in all fuel using industries in the East, as well as in the rest of the country. Moreover, smoke means waste, and a tremendous waste at that, waste of the unconsumed carbon of which it is in part composed.

Processes and apparatus have been invented and are here and there in use, which do to a large extent prevent smoke. A number of so-called smoke consuming devices are effective to an extent. Manufacturers, however, claim that they are all alike uneconomical, that they occasion more waste than they present. This is a condition that can be met, and it is certain that it will be. When an inventor produces a process or apparatus, or both combined, that consumes smoke, or prevents it, and that at the same time through perfect combustion prevents the waste and does not substitute one form of waste for another, the returns to the inventor will be very large. There is a fortune in this for a good many men.

GAS ECONOMY

Gas "checks" or regulating devices intended to secure a uniform pressure at the tip of the burner, and to prevent excessive pressure, thereby securing better combustion, have been produced in considerable numbers. The main difficulty encountered by the best of these is the clogging or "gumming" of the regulator by the heavier constituents of the gas. A way should be found to avoid this. A gas regulator not open to this objection should have some value.

The waste in gas consumption is due to imperfect combustion. This is true in the case of natural gas in a very high degree. The greatest saving to be effected by an invention in this line will naturally be in the direction of producing more nearly perfect combustion in the burners in which natural gas is used for heating and cooking, the quantity so used and the proportion now being wasted being greater than in the case of illuminating gas.

The saving that can theoretically be effected in these lines is very great, and devices and apparatus intended for this purpose will sell readily on demonstration. Moreover, demonstration of the actual working of the device is easy and inexpensive.

The American inventors have made the United States the greatest nation in the world by reason of the marvelous patents produced.

CONDENSATION IN STEAM CYLINDERS

There is a distinctly appreciable loss of power in any condensation of steam before it reaches the exhaust. A good deal of this occurs in the steam cylinder. In the theoretically perfect boiler and engine there would be no condensation, and no use for steam traps. This theoretical result, of course, never can be actually reached, but it is well to keep it in mind. Convenient means for decreasing condensation increase power and efficiency. That is worth money wherever a steam engine is used. No one needs to be more than reminded of the great value of a successful invention in this line.

"SCALE" IN BOILER TUBES

This is an incrustation supposed to be produced by the deposition of the mineral constituents of the water used, on the inside or the outside of the tube, according to the nature of the boiler, whether of the water-tube type or otherwise. The obvious effect of "scale" is to waste more and more fuel as the "scale" thickens. The immediate objects sought by inventions in this line differ. Some aim to prevent the "scale," and others to render it readily removable. One result or the other is sought by the many "Boiler Compounds" in the market. What are probably the best of them do not materially prevent the deposition of "scale," but cause it to deposit in a hard, thin layer, which comes away from the boiler tube or the inside of the boiler clean and is easily broken up by a light hammer stroke on the metal itself; but there is a great deal of room for improvement in either direction mentioned. An improved "Boiler

Compound" will probably be inexpensive to manufacture. None of the present compounds are costly.

The field is large. A successful invention in this line, one that really gives results, will be easy to demonstrate, and the profit to the inventor should be considerable.

LUBRICATION OF COMPRESSION CYLINDERS

Refrigerating machines, locomotive air pumps and all machines using compression cylinders require a better method of lubricating the piston and the interior wall of the cylinder. The interior, of course, cannot be gotten at during operation, which is just the time when trouble occurs. Unlubricated, or "dry," the friction between the piston head and the wall of the cylinder is wearing both with every stroke. If this is kept up for a short time it means a new piston head slightly larger than the old one, as packing, under many circumstances, can not be used. In many cases, as for instance in breweries, where compression cylinders are used to increase carbonic acid gas pressure for charging beer, and in nearly all types of ice machine compressors, any lubricant that imparts an odor to the gas can not be used, glycerine being frequently used as a lubricant in such cases. The feeding apparatus must distribute the lubricant from the interior of the cylinder on the down stroke of the piston. And the feed must be automatically regulated. Also the lubricant must enter the piston under the right pressure. No feed mechanism now made for this purpose meets all requirements.

A device that will be automatic, effective, and not too high in cost, and that can be readily adjusted to the compression cylinder, will find a market at a price that will pay the inventor. In this case, also, the successful inventor will not need much money in order to get his invention thoroughly tested, or to get it to a profitable market thereafter.

LUBRICATION IN THE CYLINDERS OF GAS ENGINES

This is a very different proposition from the last. The problem to be met involves other factors and conditions. The main difficulty arises from the high temperature created by rapidly succeeding explosions. If the interior of the cylinder and the portion of the piston head in contact with its interior wall are wholly unlubricated, wear and consequent waste caused by the loose fitting piston head obviously result. A lubricant that can be well distributed over the interior wall of the cylinder on the down stroke of the piston, and that would not be rapidly consumed, as the hydrocarbon oils invariably are, would be a discovery of great value. There is also room for apparatus invention in the way of improved means of applying the lubricant.

Given a thorough understanding of the conditions and the difficulties, study and successful invention in this line should prove highly profitable to somebody, and probably will.

AUTOMOBILE INVENTIONS

The automobile and the manufacturing industries resulting from it have brought into demand and ultimately into use a number of inventions which have proved profitable, some of them very highly so. There is today a demand for improvements in automobile construction, as well as in the construction of necessary features and attachments. The machine still needs lighter construction without loss of structural strength, devices for taking up shock, and diminishing or taking up vibration, increased simplicity of construction and operation, and inventions of many kinds adapted to make it more "fool-proof." It is always calling for improvements in minor details.

Mr. J. M. Hill is authority for the statement that automobile sales for 1910 reached the stupendous total of $400,000,000 in this country alone.

REPAIRING PUNCTURES IN PNEUMATIC TIRES

Somebody ought to produce a cheap, convenient and effective means for repairing a punctured automobile tire on the road, without winding the tire with tape as at present, which latter is always unsightly and often ineffectual. Preferably the device should not hold itself, or be held, against the pneumatic pressure from the inside of the tire, but should have that pressure back of it; in other words, should be held in place, or reinforced, by the pneumatic pressure itself.

CARBURETTERS

So long as the exhaust of an automobile engine has the familiar odor of partly burned gasoline and leaves behind it a distinct and unpleasant trail, combustion is incomplete; in other words, the gasoline is not doing its full work, is in part wasted, the waste being converted into smell instead of power. This incomplete combustion is usually traceable to the carburetter. The carburetter has been aptly said to be the heart of the machine. Theoretically the carburetter admits the gasoline in proper quantity and at the proper rate, air likewise, mixes the two in such proportion that there will be just sufficient air combined with the gasoline to insure perfect combustion, and delivers the mixture to the engine. Here is where trouble occurs.

The carburetter must be capable of manual adjustment, but must operate automatically as to intake of gasoline and air, and mixture and delivery. The proportions must be right, the mixture complete, and the delivery at a given speed uniform. The conditions are simple and easily understood, yet somehow they never seem to be perfectly met. There is still a good deal of waste through imperfect combustion, and new carburetters designed to overcome it appear from time to time.

A number of types of carburetters are in use, some of them on many thousand machines. Practically all of them are patented. Some are manufactured and sold to automobile manufacturers, some are manufactured by automobile concerns on royalty, and in other cases the automobile concern itself owns the patent. Carburetters sell at from $10 to $50. One of the best the writer has seen costs $3.25 to manufacture and sells for $12.

A carburetter that will save one-half of the gasoline now wasted per horse power developed, and that is well protected by a patent or patents intelligently taken out through competent attorneys, is worth a fortune, and its inventor will realize one.

SPARK PLUGS

The great improvements made in explosive engines and the extended field for their use have necessarily stimulated improvements in spark plugs, which are employed in the ignition of the gas in the explosion chamber.

It is of the highest importance that the spark plug should not fail to produce an igniting spark accurately and constantly. This is necessary in all stationary and automobile engines, but in engines used in flying machines it becomes a vital matter. Failure of ignition at critical moments means the danger of a serious and often fatal accident. This field has been explored to some extent, but there is still a very large margin for inventive ability. The inventor who produces a spark plug that is absolutely reliable, that never fails to "spark" accurately and continuously, and who properly protects his invention, has a reasonable assurance of a fortune.

STORAGE BATTERIES

Mr. Edison several years ago invented and has since put in practical shape a storage battery of two or three times the efficiency of the old storage battery of equal weight. With his usual frankness he says that this is not by any means the last word in storage batteries; that his battery is capable of improvement, and that a good deal is to be looked for in the future from the work of others.

One of the uses for an improved storage battery is in the power houses of traction companies, in getting over what is known as the "peak," which calls for extra power when the great strain comes on the generating apparatus during the "rush" hours in the morning and at the close of the day. A storage battery that can be operated with minimum leakage and that effects distinct economies in operation would be in demand for storing up power during the less active traction hours for use in getting over the "peak." A further improvement in storage batteries would be in broader demand as adapting the storage battery and electric motor to wider use in wheeled vehicles of all kinds. A clever and successful electrician, himself an inventor of ability, once remarked to the writer that the time would come when we should buy current for household use in light storage battery cells delivered and exchanged at the door like full and empty bottles of milk.

EXTERMINATION OF FLIES

The common house fly was once regarded as a harmless nuisance, and by many scientific men of fifty years ago was looked upon as a useful scavenger, consuming matter that would otherwise become dangerous to health.

We know better now. We as children were forbidden to wantonly take the life of the "harmless, innocent" fly. This innocent is now known to be one of the most deadly enemies of the human race. It is an active germ carrier and therefore a means of infection in the case of substantially all diseases the poison of which enters the system through the mouth and alimentary canal. In the typhoid chart kept by the New York Board of Health the line begins to rise soon after the opening of the fly season in May, and continues very far above average until some time after freezing weather sets in, its continuance for a time thereafter being caused by infection which has taken place before the disappearance of the fly.

The only practical remedy so far devised has been the covering of stable refuse and other decaying matter in which the fly deposits its eggs with wire gauze. General employment of this method is difficult in itself and difficult of enforcement, even by the most active sanitary squad. Some more effective means, more easily employed and capable of better enforcement, is urgently needed. It is not too much to say that, universally adopted, it would materially increase the average term of human life.

Neither is it too much to say that a successful method of extermination, chemical or mechanical, would be welcomed by the health authorities of cities and towns throughout the country, and, given reasonable cost, would be widely adopted.

INSECT PESTS GENERALLY

The mosquito problem has already been dealt with more or less successfully. In the main the treatment consists in the spraying of all standing water in the neighborhood with raw or refined petroleum, which forms an infinitesimally thin scum on the surface, and kills the larvæ, which move freely in the water, when they come to the surface, as they must. The protection of a whole neighborhood by this means is somewhat expensive, and no standing water whatever can be overlooked with any certainty of success. Mosquitoes will breed in a half empty tomato can. There is room for improvement, even in this method, which has once at least, however, in the hands of our military medical staff, proved itself thoroughly efficient, the mosquito having been once practically exterminated in the city and environs of Havana. Something that has greater convenience of application is needed.

Crop losses from the "Green Bug" and the "Chinch Bug," which attack, at different periods of growth, wheat and other cereals, mount into the millions annually. Other insect pests which attack other crops, for instance potato plants and fruit trees, also cause a great annual loss.

These conditions offer an opportunity to the inventor to effect a saving on a very large scale, with a corresponding return to himself.

AGRICULTURAL INVENTIONS

Farmers all over the country are getting rich. That means that the demand for improved mechanism for farm use, which to an extent will supersede manual labor, is on the increase. Another factor in the demand for such improvements is the growing scarcity of farm labor. In the more productive areas, especially in the farther West and in the irrigated lands, a farm laborer who is good for anything has a chance of becoming a proprietor in a small way within a few years. When he gets to that point, he quits his job. But the bulk of farm labor obtainable, even under the fair wages and more healthful conditions that the farm offers, is of poor average quality, in the South of the very worst. Any invention that enables a farmer to dispense with one or two inefficient hands, that decreases the cost of his product, will find a quicker and very much wider market than that of ten years ago. Also, aside from plows, fencing and harvesting machinery, and notwithstanding all the agricultural inventions for which patents have issued, less, on the whole, in the last fifty years has been accomplished by the inventor for the farm than for other great industries.

Some of the later developments in agriculture call for special inventions. The sugar beet industry, for instance, needs harvesting machinery.

Light ditch digging, planting, cultivating and harvesting machinery reduced to one mule power, that would be practical and labor saving, would find a ready market on the small irrigated farms in the West, the number of which is increasing day by day.

COTTON PICKER

The entire cotton producing area is cursed with a bad labor system, and the most inefficient and unreliable labor to be found in any civilized country in the world. The crop in this case must be picked on time. Serious financial loss may result from neglect. If this work could be done by machinery operated by skilled white labor, the prosperity of the States in the "cotton belt" would be materially increased. An invention which really solves the problem would be widely adopted, and the planter could afford to pay a good round figure for a machine which would make him independent of negro labor in the cotton picking season.

The money which Eli Whitney might have made, but did not make, from the cotton gin, would be exceeded many times by the returns from a practical cotton picking machine.

The production of such a machine presents no insuperable obstacles, when we consider the development in other lines of agricultural machinery and in machinery which handles the products of agriculture. Every one is familiar with the McCormick reapers and binders, but not every one may know that there are machines in wide operation in the canning industry which take green peas, vines and all, into the hopper and turn them out shelled, cleaned, and ready for the can, a different invention, of course, but one that twenty years ago would have been regarded as wholly impossible.

The cotton picker is coming. There is a way, and some inventor who familiarizes himself with the exact conditions under which such a machine must operate, is sure to find it; with highly satisfactory results to himself.

HOUSEHOLD REFRIGERATING APPARATUS

It is within the recollection of men not very old when in all breweries the cooling of the beer or other malt liquors was effected and the temperature maintained by the use of ice, and when the breweries were about the largest consumers of natural ice. Every brewery now has its refrigerating apparatus, the low temperatures required being produced by the expansion of liquid or compressed gas, usually ammonia. On its return to the so-called "ice machine" the expanded gas is compressed and expanded over again to produce or maintain the required temperature in the beer cellar or cold storage. The use of natural ice for maintaining a given low temperature in a room or compartment of any size has been discontinued entirely.

But in the house we still use artificial ice at great expense and a good deal of inconvenience. The production of practical refrigerating apparatus for domestic use involves a simple and cheap motor and a compressor and circulating system, the whole to work automatically when desired and without more than occasional supervision. It is entirely conceivable that a system may be constructed and assembled that can be controlled thermostatically by the rise and fall of the temperature in a refrigerating chamber.

The whole system must be "fool proof" so that a person of little experience and not more than ordinary sense can operate it.

The problem presents no insurmountable difficulties. The greatest one is to bring it within the means of people in moderate circumstances, which does not look by any means like an impossibility.

The value is perfectly obvious.

CAR FENDERS

A number of patents have been granted for different forms of this indispensable safety device for street cars. Practically all street cars must, according to city ordinances, be equipped with fenders of some sort. It is the exception to find a street car in city service not provided with some sort of a fender. No fender of any type now in use can be absolutely relied on to pick up the person with which it collides. The chances are that it will let the victim under the wheels just as if no protective device were applied to the car. The V-shaped guard which is in some cases carried on the truck underneath the car and rides just in front of the wheels, is far more effective and certain, but is very apt in itself to kill or maim the victim of the accident.

INVENTIONS NEEDED

A really effective fender that can be relied on in every case to pick up the person on the track without doing him injury, or that can be relied on to pick him up at all, is yet to be invented. An apparatus not too cumbersome or costly and absolutely automatic and certain in operation, which would provide a means whereby the car would be brought to a full stop within a distance of not more than five or six feet, upon contact of the fender with any obstruction, human or otherwise, would be highly effective in diminishing street car accidents.

It is suggested to inventors whose interest has been drawn to street car devices that the inventor of a fender that fills the requirements as to safety, certainty of operation and reasonable cost, would meet with a great reward. The object, that of preventing serious accidents, may be attained eventually without an automatic braking device. That is only one of several possible methods. In this connection it may be said that traction companies, instead of enlarging their political ownership of cities and towns, are coming more and more under municipal control, and that the present tendency is to force them, whether they like it or not, to adopt better safety appliances and more of them. There is a lot of money in the right thing, not only in this, but in other safety devices for street car use.

SAFETY DEVICES

Another word on safety devices in general, whether adapted to steam railways, street traction systems, manufacturing plants or mines.

As a result of national and state legislation, an awakening public conscience and a growing sense of responsibility on the part of states and municipalities as to their share, through ineffective supervision or total lack of it, in making various occupations more dangerous to health than they need be, as a result also of the better control which the public, through their legislative and executive representatives, are coming to have over the conduct of large industries, especially those operated by corporations, the demand for safety devices and appliances is increasing and will continue to increase, under compulsion applied by national, state and municipal authorities. The time was, and not very long ago, when a safety appliance which involved expense to the owner of a plant or a corporation controlling a railway, traction company, factory or mine was about as hopeless a thing to try to handle, develop or in any way bring to market as existed.

This condition of things has changed rapidly. There is a market for inventions of this kind which have distinct merit, and the market is broadening day by day.

PNEUMATIC STREET CLEANING

A method or apparatus for street cleaning which will avoid "raising," in other words disseminating dust, with consequent danger to health, dust particles in the air being a prolific source of infection, is badly needed. Automobile street cleaning apparatus is already used in some cities. Pneumatic cleaning is successfully used in houses, offices and other interiors, with advantage to the public and profit to a number of inventors and operators. A combination of the two which will carry dust and street refuse to a closed container, where the dust can be slightly dampened, and from which it can be readily dumped, perhaps involving the use of a container readily detached and replaced by another, should, if properly worked out, meet the requirements.

The right thing in this line will find a market.

THE PHONOGRAPH—GRAPHOPHONE

Something has been done already to remove the peculiar metallic "twang" of the delivery in this class of instruments. Much yet remains to be done, as practically every one can testify.

A substantially continuous record in the form of a ribbon, with the recording apparatus adjusted to it, would find a market, if thoroughly worked out in a practical way. A whole opera, symphony or oratorio, or previously selected portions, could be reproduced continuously by such an apparatus.

RUBBER SUBSTITUTES

The invention of pneumatic tires, adapted in the first instance to bicycles, completely unbalanced in a year or two the relation between the demand and the supply in the rubber trade. The price of crude rubber went up by leaps and bounds. As the bicycle making industry declined the automobile more than took its place, creating a new demand greater than existed at the height of the bicycle fever. This increase has continued to the present time at an enormous rate. More or less successful attempts to cultivate the rubber tree have not produced results sufficient to affect the market price in the slightest. This condition makes a strong appeal to inventive genius. It is possible, though unlikely, that a complete substitute for rubber, having all its present valuable qualities, susceptible of vulcanization or some other process which will produce the same effect on the new substance that vulcanization does now upon rubber, and adapted to all the purposes for which rubber is now used, will be invented.

But in a hundred different arts there is a demand for rubber substitutes adapted to special purposes and not necessarily adaptable to others. Celluloid occupies a part of this field, but only a part. Other rubber substitutes for special purposes have been invented, some of which have proved highly profitable. The better part of the field, embracing the broader uses, is still open.

An elastic, resilient substance which will take the place of the pure rubber now used, wholly or in part, in automobile tires, has not yet been produced. The demand for such a substance is almost incalculable, extending well over the civilized world. The same thing is true in other arts where the qualities of elasticity, resiliency and a certain degree of wear-resistance are indispensable.

What has been done in the production of rubber substitutes is a mere beginning compared with what is likely to be accomplished in the next few years. These also will be inventions not difficult to demonstrate, and not costly to develop to a point where they will command capital.

UTILIZATION OF WOOD RESINS

Camphor as an Illustration

More or less has been done already in obtaining new and valuable products from pitch, and also from the "lightwood" which remains after the pine tree has been gradually killed by continuous tapping. In the number of products extracted from the pitch or from the wood itself, these may become a source as prolific as coal tar in useful products extracted from them.

Camphor has advanced enormously in price in the last twenty years, and the price is still rising. There has been no increase in the supply as against an enormous increase in demand. The first great rise was due to the perfection of celluloid. A factor that has still farther and in an even greater degree increased the demand has been the use of camphor in the various kinds of smokeless powder. In the latter instance camphor is the only satisfactory solvent so far found for cellulose. It is entirely within the possibilities that a substance may be developed from the sources just indicated that will take the place of camphor for this purpose. It is another case like that of rubber substitutes; the product need have but this one quality of camphor in order to make it of tremendous value.

This is an extremely interesting field for the inventor, holding great possibilities.

UTILIZATION OF BY-PRODUCTS

In some instances this has been carried almost to perfection. It is already an old saying in the pork packing business that it utilizes all of the hog but the squeal. Even the blood is dried by a special process and used in making ammonia and fertilizers. Mineral wool is made from furnace slag, but in many another industry by-products are still going to waste.

VOTING MACHINES AND DEVICES

The voting machine, though it has been practically used in a number of municipalities, is not an entire success. Theoretically it should be the best possible method of registering the will of the voter. Theoretically it does its work with even greater secrecy than the Australian ballot system now in general use in the United States. It not only registers the vote but counts it, thereby obviating all possible danger of fraud in the count. Every public man of character hopes to see it a practical success and so does every honest voter, and even every honest politician, however partisan he or they may be. It would be adopted all over the United States if it could stand the severe working tests necessarily applied, operating without sticking, getting out of order, making a false registration or calling on the voter for any exercise of ingenuity or judgment beyond that involved in the simple casting of his ballot. No voting machine hitherto tested has absolutely fulfilled the requirements on all of these points, if the general opinion of the authorities who have tried it in various places is to be taken as decisive. Here is an entirely possible invention that the whole country is waiting for and that will require comparatively little expense to bring to market.

The writer thinks the practical efficiency of the later forms of cash registers, the Burroughs Adding Machine, and the successful demonstrations made of the work of the Howieson Calculating Machine, which goes farther than the Burroughs in that it is adapted for a good deal of work for which the former is not, indicate that full efficiency will ultimately be attained by the voting machine. This, however, must be the result of inventive ability. All three of the machines above mentioned are key-operated registering machines, never make a false registration, seldom get out of order, and stop if they do.

The necessary improvements in voting machines are certain to come, and the profits will be worth talking about.

MEANS FOR PREVENTING THE "FLICKER" IN MOVING PICTURES

This has not so far been accomplished, as millions of patrons of moving picture shows can testify. It may be done by some modification in construction of the shutters now in use, by a new shutter, or by changes which go farther into the construction of the moving picture machine. That this blemish on the work of the machine will be ultimately removed is almost certain. With the wide and growing popularity of the nickel moving picture show, the value of the improvement is almost incalculable. It is stated on good authority that the gross receipts of the moving picture business for 1910 reached $200,000,000 in this country alone. Some one is likely to get the results that will accrue from this invention. If you are posted, or can post yourself, on the mechanism of the machine, why should it not be you?

FLYING MACHINES

In these we include the dirigible, "lighter than air" type, in which the car and motor are suspended from a cigar-shaped balloon, as in the Zeppelin, Santos-Dumont and Knabenshue machines, and the "heavier than air" aeroplane. At present each type has its advantages, weaknesses and dangers. The "dirigible" still holds its lead as a weight carrier and can rise to a greater height in the air. The aeroplane is less easily disabled by missiles in its military use, moves easily and rapidly against the wind and is far more easily and effectively controlled. Both badly need safety devices, and the aeroplane needs improvements which will increase its steadiness and carrying capacity. Both types will be improved, by many more inventions, in general efficiency and convenience. Much must, and will, be done by inventors to adapt both machines to practical, everyday use.

U. S. SUPREME COURT.

"The growth of the patent system has reached a stage in its progress where the variety and magnitude of the interests involved require accuracy, precision and care in the preparation of all the papers on which the patent is founded."

MANILA "HEMP"

A power machine for cleaning (decorticating) the banana stalk, which contains the well-known manila fibre, is urgently needed. Such machines have been invented for sisal, jute, ramie and other useful fibres, but manila is still cleaned by hand labor under the same methods that prevailed a century ago. Cordage fibres for the standing rigging of vessels have been largely replaced by steel, but for running rigging and cables the cordage fibres will always hold their own. Of these manila is by far the strongest, most durable and highest in price. The late J. C. Todd, one of the most distinguished and successful inventors of cordage machinery in the world, whose machines practically created the sisal industry in the Bahamas, told the writer shortly before his death that such a machine was possible and that he believed he was close to a solution of the problem.

A chemical process might be devised that would do the work, but for the fact that such a process would almost certainly impair the strength of the fibre.

Here is a great staple, in use all over the world, the cost of which can be and eventually will be greatly reduced by invention.

METALLIC RAILROAD TIES

Inventors have been at work on this problem for nearly thirty years, ever since we woke up to a realization of the fact that our timber supply was not inexhaustible, which we were very slow to do. It can be stated positively that an effective substitute for the wooden tie will be found.

A boy digging for a woodchuck was asked if he expected to get him. His answer was: "*Got* to get 'm; the minister's coming to dinner." We are in exactly that position with regard to the railroad tie. Somebody is going to invent a substitute for the wooden tie that will be practical and cheap. On this point it may be said that a rigid metallic tie will not take up and "smother" the vibration as the wooden tie does. The inevitable result is gradual and progressive loosening at the joints, no matter how tightly they may be bolted, and gradual molecular changes in the metal of the tie itself. All kinds of hollow metallic ties, while supplying some resiliency, are open to the same objection in a somewhat less degree. Concrete and other compositions that have been tried have no resiliency whatever and show a tendency to disintegrate under vibration.

But that this problem will be solved, to the great advantage of the railroad companies and the public, and with corresponding profit to some inventor or group of inventors, hardly admits of doubt.

FOULING OF SHIP'S BOTTOMS

In the days of wooden ships this was avoided by coppering the bottom of the vessel below the water line, though that did not prevent the accumulation of some barnacles. Applying sheets of copper directly to the bottom of the steel vessel is, of course, entirely out of the question, on account of the electrolytic action which is very soon set up and is destructive to the hull. In some light-draft gunboats built by our Government twenty years ago for use in tropical waters, this difficulty was met by covering the steel hull with a skin of wood and putting the sheet copper over that. Such a method is, of course, impracticable for general purposes.

The bottom of a steel vessel not covered fouls and "pits" rapidly, especially in tropical waters. No really effective means for preventing this has yet been devised. As things are, a steel vessel, in order to remain in good condition, must go to the dry dock at least four times as often as the old-fashioned copper sheathed wooden ship.

A number of compositions, intended to be applied to steel bottoms in the form of paint, have been devised, and some of them have been patented. The best proof that they are not effective is that none of them have gone into anything like general use.

It may be that the inventor who is successful in this line will have to secure his results by special treatment of the plates of the vessel in order to render the surface of the steel non-corrosive and not liable to attack under the conditions which at present cause fouling and "pitting." Or the treatment may have to be given to the steel in the crucible itself, something that is not entirely as chimerical as it may look.

WAVE AND TIDE MOTORS

"The ocean old, centuries old;
Strong as youth, and as uncontrolled."

Its strength has hitherto been manifested usually in its destructive activities. It destroys man's work, but has never been harnessed to *do* his work. And yet the power is there, in the rise and fall of its tides and the motion of the waves, power enough to light and heat a continent.

Many experiments have been made in the direction of getting power from the tide or from wave motion. Some of them have been successful enough to confirm previous theories. Even a century ago tide mills were strung all along the New England coast from Cape Cod to the Bay of

Fundy. But no one has so far made wave motion of any practical value—has really harnessed the power of the sea.

Electricity is likely to contribute to the ultimate solution of the problem, which solution some time or other is likely to be found. A storage battery exactly adapted for the purpose would undoubtedly be of assistance, as one difficulty in using wave motion to develop power is that it is intermittent and varies greatly in intensity.

TOYS, GAMES AND PUZZLES

Inventions in this line which take with the public are always profitable to somebody, either the inventor himself or the man who purchases the invention. Such things will always continue to be produced, and in many cases will pay. In this line of invention it should be borne in mind that the life of nearly all these things is very short. They have their brief season of popularity, followed by practically entire cessation of demand. Three years is a very long time for most novelties that can be classed under any of the three heads. These things call for quick work. If unprotected they are more likely to be misappropriated than are most other inventions.

The inventor who thinks he has a good thing in any of these lines should obtain his patent without delay and get it on the market as promptly as possible. It is better in these cases to accept a moderate royalty per article, or to make any arrangement with the manufacturer that is at all reasonable and at the same time safe, than to delay much in getting the article on the market. But in this class of inventions there is frequently a chance for a large and quick profit.

DEVICES FOR THE HOUSEHOLD, FARM AND OFFICE

It would be difficult to enumerate the possibilities open to the inventor in these lines. There are a great many of them. A really meritorious and useful article that is convenient and cheap; that, for instance, saves labor in the home, effects economies, or obtains better results on the farm, or ministers to convenience, promotes accuracy, or saves time in the office, is always in demand and the limit of invention in these lines will never be reached. An inventor working in any of these directions should be informed, or inform himself, as to what has been accomplished and as to what is needed, which, by the way, is true of practically every line of invention, but is a thing that in these cases is comparatively easy to do.

PERPETUAL MOTION

Let it alone, no matter what name is given it. It is usually called something else.

Inventions of our clients, when protected, are brought to the direct attention of those manufacturers and men of means who in our opinion are most likely to become interested.

FINDING A MARKET

OPPORTUNITIES for selling useful patents were never so many as they are today. But these opportunities must be seen and taken advantage of at once. There is a vast difference between dreaming of an invention and having visions of millions of dollars.

The manufacturer is like the man from Missouri. He has to be shown. And in this we make a specialty of helping you. Get your patent—have a model of your invention—and we will help to put you in touch with those people who desire such an invention. We go so far as to carry a list of requests that manufacturers have made to us for specific inventions, and we are developing a system of correspondents throughout the country to keep us in touch with manufacturing and industrial concerns looking for improved machinery and methods.

A letter to us requesting such information will result in your securing a description of how you can be put into touch by us or by our correspondents with those capitalists who are looking for useful inventions.

Capital will not come to you. You must go to the places where capital is.

OPPORTUNITIES NEVER WIDER

Seven figures have been realized on a good many inventions. The same successes can be repeated in a hundred lines of industry, but not without protecting the invention first, and using practical sense and some business intelligence afterward. Sitting on inventions does not hatch profits.

ATTORNEYS—COST OF INFERIOR SERVICE

It is probable that the employment of attorneys who aim to get a "patent" without regard to its quality, the extent to which it protects the actual invention, has been one of the most expensive of inventors' mistakes. The saving in first cost has been small, often nothing at all, but the ultimate cost can be figured in tens of millions. If the invention is worthless it makes no difference who the attorney is or how he does his work. If it is valuable it makes a great deal of difference.

PATENT ALL USEFUL IDEAS

Go to the Patent Office with every idea that is useful and practical. Do not make the mistake of thinking that because the idea is simple it is therefore unpatentable. Some of the best among patented inventions are the simplest. If everybody says, "Why didn't somebody think of this thing before?" the chances are that it will pay. In the average case and in the long run this practice gets results. Neglect of it has benefited the public and deprived inventors of justly earned profits to a tremendous amount.

DEVELOPMENT ALWAYS ADVISABLE

Many inventors hesitate to sacrifice an interest in order to demonstrate practically what they have on paper or in their heads. Their inventions, among them some of great merit and value, die of dry rot in consequence. Wherever practicable, develop an invention, even at the cost of an interest, instead of trying to sell it without development. You will make more in the end. Inventors have missed millions in profit by taking the opposite course.

MISPLACED CONFIDENCE

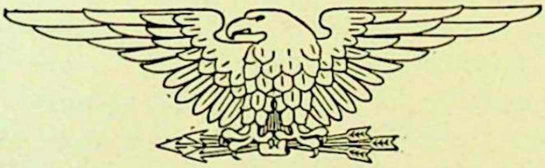
Misplaced confidence, disclosure of the idea to the wrong people, frequently means the total loss to the originator of a valuable invention. Attorneys, even disreputable attorneys, seldom misappropriate the invention. This is done at an earlier stage by persons to whom it is disclosed, or through their description of it to others. Absolute safety lies only in getting it into the Patent Office as early as possible, it being usually impossible to avoid more or less disclosure.

DISCLOSURE BEFORE APPLICATION

Showing the invention to a professional draftsman, model maker or attorney, or to a trusted friend, is one thing, and disclosing it, before application, to a speculator or manufacturer, is another. The former will probably keep the inventor's secret, the latter may use it. The Patent Office invariably keeps it.

RISK OF DELAY

Every day that the inventor who has perfected a valuable improvement delays the filing of his application, he is running an increasing risk, as many a man knows to his sorrow. It makes no difference whether the man who steps in ahead of the first inventor has stolen the idea or invented it later. It means in either case an expensive additional proceeding, with the chances usually against the rightful applicant, or a total loss.



Sometimes an inventor is capable of selling his own patent but inventive genius and the gift of salesmanship are not often found in the same person.

If an immediate market does not already exist for your patent it might be created by an intelligent demonstration of the improvement.

GREAT MEN'S IDEAS OF GREAT NEEDS IN INVENTION

(From the New York *Times*, Sunday, November 22, 1908.)

MOORE	HEDLEY	PALMER
EDISON	NIXON	HEWITT

The dreams of yesterday are the realizations of today. We live in an age of mechanical, electrical, chemical and psychical wonder. On every hand the human mind is reaching out to solve the problems of earth and sky—the problems of nature. In those solutions are hidden the mysteries and the revelations of all things. While the dreamer may dream, it is the practical man of affairs, with a touch of the imaginative in his nature, who materializes and commercializes new forces and new conceptions. Step by step these men lead in the vanguard of progress. What is their conception of the needs of the world? Toward what is their imagination reaching? What, in their viewpoint, is the world waiting for—what are the immediate needs of the world in practical, scientific conception and invention?

Here are their answers, based upon accurate knowledge and the skilful artisanship of practical work and conceptive thought. What they reveal is a prophetic look into the future and weighty with significance.

EDWARD BRUCE MOORE,
COMMISSIONER OF PATENTS

In recent years the world has been greatly interested in aerial navigation, and there has been a rapid development of this art. The dirigible balloons of Santos-Dumont, and that of Captain Baldwin recently tested with great success at Fort Myer, Va., show that it is possible, under favorable circumstances, to direct the course of a balloon at will, but this type of airship seems to be, to a great extent, at the mercy of the air currents. Further improvements must be looked for in the "heavier than air" machines, of which the aeroplane of the Wright brothers, successfully tested at Fort Myer and in France, is the best example. The fatal accident which occurred to this machine shows the great need of some form of automatic balancing device which will adjust itself to variations in air currents, and will control the machine under all circumstances without the co-operation of the operator.

The world would welcome a telephone system which would operate successfully beneath the sea, connecting the opposite shores of the great oceans.

The scratching sound produced by the graphophone might be obviated by an invention which would operate without the contact of the stylus with the record.

The gigantic harvests of wheat and corn produced in this country have been successfully handled by the multiplicity of farming implements now in use, but the great cotton fields of the South are still awaiting a cotton harvester capable of being simply driven through the cotton field and harvesting the cotton without waste. Numerous inventors claim to have produced such a machine, but none as yet has come into general use.

Washington, in common with other cities, has an ordinance prohibiting the production of smoke by boiler furnaces, and while there are many patents having this object in view, the results—judging from the number of prosecutions, followed by assessment of fines—indicate that the capital of the United States and the remainder of the world are still waiting for a smoke preventer.

The breaking of lamp chimneys, incident to the strain of unequal heating, offers a field for the invention of a glass capable of stretching without breaking. Many have sought, as yet in vain, to produce a flexible glass able to stand the same rough usage as sheet metal. The art of making the malleable glass, as known to the ancient Egyptians, has never been revived.

The rapid exhaustion of our timber, especially such as is consumed in the manufacture of wood pulp for paper, makes desirable a cheap and suitable substitute.

A flameless gun, to follow the soundless one recently invented by Mr. Maxim, would render impossible the detection of an enemy. Such a weapon would have a great effect on future tactics.

Safety devices for preventing accidents in mines, on shipboard, and on railways seem to be much needed. Stronger rail fastenings, rail joints, and a substitute for wooden ties must be found if our railways are to handle the constantly increasing weights imposed upon them by the expanding traffic of the country.

So rapidly have our coal fields been worked that in a few years it will be necessary to find some other source of heat. In order to utilize the heat of the sun, now going to waste, attempts have been made to concentrate the rays, by the aid of great systems of mirrors, upon a steam boiler, which would supply steam to an engine. This has been accomplished upon a small scale.

Substitutes for India rubber and leather would find an important place in the arts.

A method of producing electric energy directly from the combustion of fuel has engaged the attention of many inventors, among them Mr. Edison, who, however, has not brought the invention to the point of commercial success.

One of the great items of expense in running an automobile is the rapid wear of and constant injury to the pneumatic tires. Many attempts have been made to produce a satisfactory spring or cushion tire which will outwear, be free from punctures and blow-outs, and possess all the resiliency and other qualities of the pneumatic tire. A storage battery that will render a machine capable of a run of 100 miles is still anxiously sought.

The recent forest fires, which have done incalculable damage and destroyed many lives, cause us to hope for the discovery of some practical method of precipitating rain. The primitive method of back-firing seems to be the only weapon now employed to fight this faithful friend of man when it assumes the guise of an enemy.

The domestic labor problem, always with us, offers untold opportunity for the profitable development of anything that will diminish the labor or the vexation of the housekeeper. Nothing would be more welcome in any household than china that servants could not break. Another boon, not yet discovered, is a non-corrosive composition for drainage pipes.

THOMAS A. EDISON INTERVIEW

The next era will mark the most wonderful advance in science and invention that the world has ever known or hoped for. So vast will that advance be that we can now have scarcely any conception of its scope, but already a great many of the inventions of the future are assured. It is only of those which I regard as practical certainties that I speak here.

First. Within the next twenty or thirty years—and it will start within the next two or three—concrete architecture will take enormous strides forward; the art of moulding concrete will be reduced to a science of perfection and, what is equally important, of cheapness; there will rise up a large number of gifted architects, and through their efforts cities and towns will spring up in this country beside which Turner's picture of ancient Rome and Carthage will pale into nothingness, and the buildings of the Columbian Exhibition will appear common. But great expense will not attend this; it will be done so that the poor will be able to enjoy houses more beautiful than the rich now aspire to, and the man earning $1.50 a day, with a family to support, will be better housed than the man of today who is earning $10.

Second. Moving picture machines will be so perfected that the characters will not only move, but will speak, and all the accessories and effects of the stage will be faithfully reproduced on the living picture stage. This, of course, will not be done as well as on the regular stage, but its standard will approach very near to that, and the fact that such entertainment will be furnished for 5 cents will draw vast numbers of the working classes. The result will be that the masses will have the advantage of the moral of good drama; they will find an inexpensive and improving way of spending the evening, and the death knell of the saloon will be sounded.

Third. In perhaps fifteen or twenty years—depending on the financial condition of the country—the locomotive will pass almost altogether out of use, and all our main trunk railways will be operated by electricity.

Fourth. A new fertilizer will spring into existence, containing a large percentage of nitrogen. This will be drawn from the air by electricity, and will be used to increase the arability of the land. Even now this is done to a large extent in Sweden.

Fifth. All our water power will be utilized by electricity to an extent now almost unthought of, and will be used with great advantage, both industrially and for railroads.

Sixth. A successful aerial navigation will be established —perhaps for mails—and will achieve a sound, practical working basis.

Seventh. We shall be able to protect ourselves against environment by the use of serums and things of that sort so that the general state of health will improve and the average span of life will increase by a large percentage. The grand fight which is being made against tuberculosis and cancer will reach a successful culmination, and those diseases will be entirely mastered.

Eighth. A new force in nature, of some sort or other, will be discovered by which many things not now understood will be explained. We unfortunately have only five senses; if we had eight we'd know more.

Ninth. We will realize the possibilities of our coal supplies better, and will learn how to utilize them so that 90 per cent of the efficiency will not be thrown away, as it is today.

Finally, let it be said, hardly any piece of machinery now manufactured is more than 10 per cent perfect. As the years go on this will be improved upon tremendously; more automatic machinery will be devised, and articles of comfort and luxury will be produced in enormous numbers at such small cost that all classes will be able to enjoy the benefits of them.

These are some of the inventions which the world is awaiting which it is sure of seeing realized. Just how they will be realized is what the inventors are working now to determine.

FRANK HEDLEY

We're waiting for the ideal in everything—subways along with the rest. The ideal subway for New York would be the minimum distance from the street, both up and down, and would have all the entrance and exist stairs equipped with escalators, or some better means of transporting the public to the cars. Some means would have to be provided whereby the air could be rapidly renewed, and that air would have to be of a purer quality than obtains, not only in the subway of today, but on the streets.

Our ideal subway would have to be equipped with such a car equipment that injury both to passenger and employee would be impossible. In order to accomplish this it would be necessary to invent some means or ways that would absolutely eliminate the infallibility of man.

It would be further necessary to have invented and manufactured electrical and mechanical contrivances which would never get out of order under any circumstances; also to have an interlocking and signaling machine which would prevent any derailment and prevent any car from taking the wrong track. Incidentally it would be a big thing for some engineer who is striving for a high pinnacle of fame to invent a rail for general use that would not break and would be impervious to climatic changes, causing expansion and contraction—things which have caused the loss of many lives on all railroads.

Briefly, if all these things are ever accomplished, the result will be an ideal system of transportation, better than the world has ever known or the angels in heaven ever hope to ride upon.

A subway thus equipped and operated would necessarily have to be so constructed that it would net at least a fair return on the money invested.

LEWIS NIXON

Inventions in connection with sea-going vessels come just as unexpectedly as on land.

Of course no one expects any revolution in types of vessels or methods of propulsion, as great vessels cost too much to permit other than the most conservative experiments.

The production of steam has, so far as economy in fuel consumption is concerned, reached nearly its limit.

But the very fact of the gradual using up of coal and that the cost of fuel will increase may lead to a more extensive use of the sailing ship, as winds will continue to blow and their energy can not be cornered. But the sailing ship of the future will, I feel sure, be an auxiliary—that is, have power to drive her in calms and against head winds. The engine for this purpose will almost certainly be the gas engine. The next important step in marine propulsion will be to follow the great success of the gas engine on land and apply it to the propulsion of vessels. This will save in fuel and space occupied, give more room for cargo, and greatly reduce the strain on the machinery operatives.

With the increase in size will come more efficient means for handling freight.

It may be that screw propeller efficiencies will be greatly bettered, and that propellers better fitted to fast revolutions may be developed. In this there is opportunity for radical changes.

Of course, with the improvement in making steel and other alloys the advantages to be gained from the use of stronger sections of less weight will result in a uniform advance, but this is always going on.

Before many years we shall see the absolutely fireproof steamer for carrying passengers.

But it will be with the war vessel that progress will be most spectacular. Heavier guns, heavier shell, more efficient powder, greater perfection in sighting and firing are the results of present development. I expect soon to see the heavy masts, conning towers, and smokestacks disappear. They are all needless, and the future battleship will not have them.

In 1902 I pointed out that it would some day be possible to project electrical impulses with the possible result of shocking to death the men on an enemy's ship or at least of rendering them helpless.

I do not dare prophesy far in the future. All that I have said above are events in the making.

CORTLANDT E. PALMER, MINING EXPERT

The prevailing scarcity of both common and skilled labor in the precious metal mining districts of this country and of Mexico furnishes a wide field of opportunity for inventors and for those whose originality of method is paramount to invention in mining and ore-milling operations.

The labor situation, which has long been the most vexing problem in the economics of our mining districts, has become, contrary to common impression, quite as serious in the more important camps of Mexico, and in both countries. Superintendents and foremen have long since ceased to examine into a workman's fitness with the old-time care before engaging him. The usual complement of limbs and muscle suffices for the obtaining of employment, regardless of race, experience or personal record of the applicant. The result of the conditions outlined has been inevitable. A rising scale of wages has gone hand in hand with a falling off in output per unit of labor cost.

In mining and its allied operations, as in other industries, much thought and large sums have been expended in the endeavor to hold the common laborer and the skilled workman to their occupations, but complete success has been attained in rare instances. And in casting about for an explanation one is forced to the conclusion that the development of a mechanical age is largely responsible for the disappearance of the man who has made his livelihood by his muscle or manual skill.

It would seem good judgment to swim with so strong a current rather than against it and endeavor to perfect the substitution of automatic mechanical methods for the manual labor which is becoming more and more inadequate as to supply and less and less efficient year by year.

For the meeting of the conditions outlined the same policy of development is indicated in mining operations which is serving with cumulative efficiency for the rescue of other industries from the bane of insufficient, inefficient labor. We must do more things mechanically which we now do by hand, and we must do better those many things which are already done mechanically.

As between the entirely new devices required and the improvement of existing devices it would seem that the greater number of opportunities for inventive genius lies along the line of improvements—for the reason that so large a proportion of operations is already performed mechanically in a more or less imperfect way.

As examples of recent important improvements in mine equipment, mechanical drill sharpeners and hammer drills stand out prominently as making for economy in direct costs and labor requirements. But none of these devices is perfected, and the inventor who brings either device a step nearer to what it should be will have his reward.

Timber framing by machinery has been practiced for many years, but a practical, simple machine which will render possible as perfect a joint as can be had by hand work is still to be produced.

An explosive affording practically innocuous products of combustion would go far toward reducing mining risks and operating costs.

There is need for the development of timber preservation plants and methods for use in mine operation, and for conclusive investigation of the practicability of substituting steel or other materials for timber in order to eliminate the constant tax for repairs in workings which must be kept open indefinitely.

In milling practice there is room for improvement in the mechanical disposal of very fine tailings, where dump room or water supply is limited; perfection is demanded in the design of crushing machinery for the producing of very fine sizes with a minimum of slimes, and the slime concentrator remains an imperfect machine after generations of invention and the introduction of hundreds of devices.

PETER COOPER HEWITT

What the world is waiting for in the way of light is simply a cheaper light. Up to the present time light has been chiefly generated by means of the arc and incandescent materials, such as the Edison lamp, the Nernst lamp, etc.; these have very nearly reached their highest point of efficiency. The latest development is the Tungsten lamp, and the greatest efficiency which can be hoped for from it is one watt per candle.

The old lights have all been generated by heating solids, but there is now a new light which is obtained by electric currents passing through vapors or gases of small density. These are called vacuum tubes, and it is to them that we must look for the cheaper—and for most purposes better—lights of the future.

Probably the best known example of this class is the Geister tube, which in the early stages of its development gave forth but little light. Recently, however, this has been worked over and experimented upon with the result that a light has been produced by means of mercury vapor that has an efficiency of one-third of a watt per candle. When it is remembered that the Edison light costs over three watts per candle, it will be readily seen that already great strides have been made toward reaching the cheap light which the world is awaiting.

Of course, like all other things, the electric light generated by a vapor has its disadvantages for the present. For instance, it does not give off all the wave lengths of light seen in the daylight; each vapor used gives off wave lengths peculiar to itself, so that such light gives to many objects a peculiar appearance. Under it, colors vary and lose their individuality, and at no time can all colors appear as they really are, but by the use of different colored reflectors and the combinations of different lamps, almost any single result desired may be obtained. The future should, however, produce a more perfect light.

But even this seems trifling as compared with the advantages of the vapor light. In the first place, it produces such a light that one can look directly at hundreds of candles of it and then pick up a hair or any other minute object from the floor without the slightest difficulty. It has come nearer to the appearance of daylight than any other sort yet produced—and it is going to come nearer yet; no other light possesses in this regard anything like the possibilities which it has shown. It causes little or no strain, more than ordinary, on the eyes, and one would feel much fresher and better after doing a night's work under it than he would had he used the arc or incandescent light. As was stated, the difficulties which arise from the distorted colors will be overcome, and it is within the range of future possibility that, by means of these color effects, a woman of forty may be made to look like a girl of twenty.

Decidedly the light of the future is the one generated by vapors. The constant work which is being done upon it is bound to bring it very near perfection, and, coupled with all its advantages, the fact that it can produce light commercially at one-half the smallest cost that the present light can hope to attain makes its future success assured.

SOURCES OF SUCCESSFUL INVENTION

It is a fact that a large percentage of practically successful inventions, especially among those which have been readily introduced and have become quickly profitable to the inventor, have been made by men familiar through their daily occupation, or through daily contact, with the line of industry to which their improvements applied; though this is not a universal rule, as some of the most valuable inventions have been made by men with comparatively little experience in the art in which they subsequently became famous. Edison is a case of one kind, and Bell, of the telephone, of the other, though it is noticeable that long study of the conditions and the problem seem to have preceded Prof. Bell's invention.

CHANCE AND OPPORTUNITY

Here and there chance and opportunity have a good deal to do with invention. Much has been done by men who, without much previous familiarity with the art or line of invention, have kept their eyes open. Quick observation goes a long way. This is especially true of many minor inventions, some of which have resulted in large profits.

DISCOVERY

Some discoveries, like the vulcanization of rubber, are not the result of study and inventive genius on the part of the inventor, but of pure accident. In that case Goodyear, of course, had the desired result in mind, so that he was able instantly to seize upon and mentally apply the accidental discovery. This instant application of a discovery to a need, deficiency or demand, previously in the mind of the discoverer, is entitled to all the credit of pure invention, and in the law is held to be equivalent to it.

STUDY OF PRACTICAL NEEDS

General study and review of the great practical needs in various arts is of value. It tends to stimulate what may be termed intelligent invention, the kind of invention in which thought precedes imagination, the inventive act itself having been more than once characterized by the Federal Courts as an act of the imaginative faculty.

A Few Unsolicited Letters from SATISFIED CLIENTS

COLLINSVILLE, CONN., Dec. 4, 1912.

Randolph & Co.,
Patent Attorneys,
Washington, D. C.

Gentlemen:

Your letter of the 29th instant enclosing patent received, and in reply would state that the result is very satisfactory to me; also, that you deserve praise for the efficient manner in which you secured it Your charges are very reasonable, and any future business I may have will be sent to you. If I hear of any one looking for a competent attorney, will recommend your firm.

Yours respectfully,

C. M. GOULD.

MEREDITH CENTER, N. H., Nov. 29, 1912.

Messrs. Randolph & Co.,
Washington, D. C.

Dear Sirs:

If the few lines below written are worth mentioning to any of your clients, you can use them:—

"That I have been connected in transacting business with four different Patent Attorney firms and none of them have given me the satisfactory results that I have derived from the firm of Randolph & Co., and their services have been to my entire satisfaction in every way."

Yours very respectfully,

(Signed) A. R. CONNER,
Meredith Center, N. H.

RAY, ARIZ., December 11, 1912

If I want to get foreign patents I shall certainly let you know, as I am very well pleased with the way you have done.

Thanking you for your work for me, I remain,

MRS. SALINA GAMBLE,
Ray, Ariz.

Fullerton, La., Nov. 4, 1912.

Randolph & Co.,
Washington, D. C.

Gentlemen:

I take pleasure in acknowledging the receipt of the letters patent on faucet. I thank you for the good service you have given me in the past, and you will hear from me later in regard to foreign patents. With best wishes, I am

Yours truly,

R. J. Long.

Box 150

Jerseyville, Ill., Nov. 27th, 1912.

Randolph & Co.,
618 F St., N.W.,
Washington, D. C.

Gentlemen:

Enclosed find bank draft for twenty dollars ($20.00), the final fee to the Government for the issue of my patent on Smoke Consumer.

I am very much pleased to get my patent and wish to say that I will do all I can for you folks, helping you get clients, etc., in these parts.

Trusting you will attend to this at once, I remain

Yours very respectfully,

C. Wesley Johns.

LEROY M. WADE
ATTORNEY-AT-LAW
VINCENNES, INDIANA

December 17, 1912.

Messrs. Randolph & Co.,
Washington, D. C.

Gentlemen:

In matter of patent crude oil burner, Lancaster, et al, I herewith enclose N. Y. Exchange, $20, to pay for the patent.

Assuring you that we are entirely satisfied with your conduct in this case, and wishing you a prosperous New Year, I am

Very sincerely,

Leroy M. Wade.

Messrs. Randolph & Co., November 28, 1912.
No. 618 F St., N.W.,
Washington, D. C.

Gentlemen:

Your favor of the 13th instant to hand, and enclosed you will find check certified for commissioner's fee which you will please attend to at your earliest convenience so that I can get my last papers at the earliest moment, and I take the liberty of giving you my most profound thanks for the quick and neat way you handled my direction signal for a patent. *You are all right.* I shall not only give you any future business I may have in your profession, but shall make it my special business to get you all I can from any one desiring professional services in your line, and if you think this will be of any service to you in future you can use it for all it is worth.

Most respectfully,
(Signed) W. B. JOHNSTON,
No. 1917 W. Main St.,
Richmond, Va.

Direction Signals for Motor Vehicles, Filed June 25, 1912, Allowed October 19, 1912.

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235 CHAPEL ST., NEWTON, MASS., Oct. 21, 1912.

Randolph & Co.,
Washington, D. C.

Dear Sirs:

I hereby acknowledge receipt of my patent relating to ball cocks. Everything was satisfactory, and thank you for the same.

Yours truly,
EDWARD J. KIVELL.

Randolph & Co. SOLON, OHIO, December 17, 1912.

Dear Sir:

The papers have just arrived and wish to thank you for the prompt and efficient service you have rendered. Later you will no doubt hear from us with more business.

Respectfully,
G. G. BACON,

The Review of Reviews Company
1215 Filbert Street
Philadelphia, Pa.
W. A. MARTIN,
Agency Manager.

Tuesday, October 15th, 1912.

Messrs. Randolph & Co.,
Patent Attorneys,
Washington, D. C.

Gentlemen:

Enclosed you will find three specifications sent me by you in reference to copy holders.

Having gone over these very carefully, I find that the diagram that I sent you is fully covered by patent No. 410602. I have neglected returning these until the present time so that I could go over this matter thoroughly and see if there were any improvements possible. At the present time I have been unable to make any change from the original.

Thanking you for the prompt attention which you gave this matter and trust that some time in the future that something will present itself which will be of mutual benefit, and assuring you that any business of this nature will be transacted through your firm only, I am

Yours very truly,

WGS/L
WALDON G. SMITH.

W. G. SMITH,
Asst. Manager.

Randolph & Co.

Gentlemen:

Your letter of October second at hand, and in reply would say I am very well satisfied with your work and would gladly recommend you to others who desire work promptly and satisfactorily accomplished. As I am anxious to sell my invention I would be very glad of your help.

Very truly yours,

CORRIE C. LEWIS,
190 High St.,
Portland, Me., U. S. L.

PHILLIPSBURG, N. J., Sept. 22, 1912.

Messrs. Randolph & Co., Inc., Washington, D. C.

Gentlemen:

With these few lines, I wish to express you my hearty thanks for the service you rendered to me in helping to get my two inventions granted, the Picture Frame U. S. P. 994,012, and the Horseshoe U. S. P. 993,848. And so I can and will highly recommend you to every one who needs the services of a Patent Attorney, for I never saw a firm who would look better out for the interest of their clients than you did. Therefore, thanking you again and hoping to do much more business with your firm, I remain Yours truly,

CHARLES LINDEMANN,
320 Warren St.,
Phillipsburg, N. J.

W. C. SMITH,

Randolph & Co., KEARNEY, MO., Sept. 28, 1912.

Kind Sirs:

I write you in regard to the patent, serial No. 702,066. Application was put on file June 6, 1912, and I received notice of allowance in about fifty-nine days, and I was sure surprised to receive the patent in such a short time. I can truly recommend you to any one that is thinking of taking out a patent as being able and well qualified to prosecute an application strictly in a business and satisfactory manner. I wish to remain, as ever, Yours very truly,

W. C. SMITH.

BALTIMORE, MD., September 18, 1912.

Messrs. Randolph & Co.,
No. 618 F Street N.W., Washington, D. C.

Gentlemen:

We beg to acknowledge the receipt of the Official Certificate of Registration for our "TOP-N-OCH" label for bread, number of same being 15,194, and dated May 31st, 1910.

Thanking you for your prompt attention to this matter, and trusting to have further business for you in the near future, we beg to remain

Yours very truly,

L. BALTIMORE SIGN CO.,
B. F. Litsinger.

OFFICE OF

Dr. F. B. CHASE

Sixth and Locust Streets

Fifth Floor

ORIEL BUILDING

Randolph & Co.,
Washington, D. C.

St. Louis, Mo., Nov. 27, 1912.

Gentlemen:

A carborundum wheel for dental purposes that will not wear *out of round* is very much needed by dentists.

Those on the market soon wear flat spots on the grinding surface making unfit for use.

Yours truly,

Fred. B. Chase.

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848 Flatbush Ave.,
Brooklyn, N. Y., Sept. 16, 1912.

Messrs. Randolph & Co.,
Washington, D. C.

Gentlemen:

I am in receipt of your favor enclosing my Letters Patent for improvement in Air Cooling Apparatus; and, thanking you of that, I accomplish my duty to declare that I am very much grateful to your intelligent assistance, and particularly for getting perfected and patented my ideas in the specification, claims and drawing with my full satisfaction.

With all respect,

Yours truly,

Gennaro Dramig.

Randolph & Co.,
618 F St., City.

Washington, D. C., Sept. 14, 1912.

Gentlemen:

Your letter is at hand containing final papers for my invention, which is entirely satisfactory to me. You are at perfect liberty to use my name for any reference you may desire. Thanking you for the manner in which you handled my invention, I am

Yours truly,

E. R. Melton,

12 9th St. N.E., City.

JOHN HUPFELD

Ladies' and Gent's Fine Shoes

St. Louis, Nov. 30, 1912.

Messrs. Randolph & Co., Inc.,
Washington, D. C.

Gentlemen:

A device for preventing shoe heels from running over would be bought and sold by every shoe manufacturer and dealer in the world. The market for it would be practically unlimited.

Yours very truly,

John Hupfeld.

Bridgeport, Conn., Dec. 2, 1912.

Randolph & Co.,
Washington, D. C.

Gentlemen:

I acknowledge receipt of patent on Igniting Device, No. 1,044,815, and thank you very much for the work you have done so faithfully.

Yours very truly,

A. Philippsen.

Messrs. Randolph & Co.,
Washington, D. C.

Gentlemen:

I take pleasure in commending the promptness with which you dispatch business intrusted to you, and am well pleased with the accuracy of your patent practice.

It well pays to procure your services in patent matters for the reason that one might lose all that his efforts should bring him by not procuring the protection of a patent right promptly.

At any time I can serve you, command me.

Yours very truly,

W. S. Poston.

ALL the World holds out the possibility of something New. The Earth, Air, Water, Sky, Stars tell a story of their vast potentialities. The World is young. Scientists have but scratched the surface. What is to be found remains to those who live and work.

To the creative mind belongs what is finite and possible in the Universe. The creative, when joined with the constructive, mind makes the inventive genius. There are not many such.

But if you have an idea that no one else has had you have an original idea and are creative. Do you know that such an idea may be worth money to you because of its value to others? Tell us what that idea is and we will help you to make the money out of it should we agree with you that the idea is valuable.

It takes no special education to be an inventor. It takes an Idea that is worth while in the affairs of men. The Idea may lead anywhere. It must be something convertible into use, something that applies to Life and its comforts, conveniences, its ease, its prolongation, or its profits.

If you have no such Idea, these comments will not appeal to you. But if you are creative there is food in every word that has been written, in every line that is in this Booklet. This Country has been built by creative genius. Possessing it themselves, the Founders protected creative genius. Your Idea, creative or constructive, was protected by them through the Patent and the Copyright laws. To foster inventive genius they offered the inventor a monopoly for a term of years on his Idea. They encouraged Brains and Thought. They left its capitalization to the possessor. You are safe under the Government when you have protected properly your Idea. We undertake this work for you.

You have thought of many ways to save yourself toil and expense. Many of those thoughts must have had commercial value, and you may have failed to reap the reward that comes to him who thinks. America is the home of the creative. In less than one hundred years over one million American Ideas have been patented. Thirty per cent of these Ideas have been original. Those who conceived the Ideas, those who executed them, have garnered of the World's treasures. The World is waiting on You.

Tell us your Idea. If it is new, creative and constructive, we can help you. We can bring together the master and the mechanic, and we can point the inventor to the market. If your Idea, in our opinion, is not new we will tell you. It is not the purpose of this Booklet to flood the Patent Office with applications for patents in which there lies no merit.

Inventions sell themselves when they are valuable and are introduced properly. Inventors have an open market, but often the inventor can not see it. We seek to make inventions known after we have protected the inventor. We do this mainly through our Sales Department which we maintain at our expense. This Department is designed to be Country-wide. Its use we give to you.

Our plan is co-operative and fraternal, developed because we know that there is much to be done along inventive lines. We want to assist, to facilitate the work of the inventor. Corporations are paying men to think out improvements on existing devices and methods, or to create something New that shall be better, faster, cheaper than the Old.

The Government has scientists working along similar lines. Unless you act promptly you may find that someone has entered the field before you and that your Idea, which may be of great value, has become valueless to you.

The riches of the earth are won by the brains of men.

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An attorney of sound professional judgment and education should be selected in patent matters.

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The products of all the gold, silver and diamond mines in the world would not equal in value the annual incomes of the owners of American Patents.

Interesting Facts About Inventions

THERE have been issued by the United States Patent Office over 1,000,000 patents. That is there is one patent for something less than every 100 persons in this country. No other argument is necessary to show that America is the seat and home of inventive genius.

Prof. Willis Moore, formerly head of the Weather Bureau, said that the countries in which the prevailing winds are Northwest are the greatest. These winds fill the people with energy; give them ideas and add red corpuscles to the blood. They make the men and women courageous, adventurous, alert and inventive. The prevailing winds of the United States are Northwest.

All inventions have their origin in some new thought to lessen labor, to economize in expenditure, to contribute to physical comfort, to cheat time. Many such ideas that have advanced civilization and helped to enrich the World have brought no reward to their originators because these have failed to realize their money value and have not protected them. They have given their inventions away. The simplest things, conceptions of fertile minds in idle moments, have proven of vast worth under the direction of those skilled in handling the new and useful inventive ideas, the trained and experienced attorneys who are familiar with inventions.

Carelessness in the matter of inventions and their worth was true especially of the early settlers of this country. Their crude inventions to improve the tools of husbandry brought with them from their foreign homes, and to adapt them to the new conditions of a new continent, form the basis for the wonderful agricultural machinery now seen on all the well appointed farms of the country. They furnished many of the basic ideas others developed and perfected them.

There are many real inventions, strokes of creative genius not patented or patentable. Each shows true inventive imagination and each had its germ in ordinary conditions. John D. Rockefeller is a business inventor. He invented a system which through consolidations and extensions have resulted in the maximum production at the minimum cost. All inventions are monopolies. The law makes them such. Rockefeller's business system invention is a monopoly. It was perfected in 1889. The life of most patents under the law is 17 years. Rockefeller's monopoly was due to expire in 1906. The Government is trying now in the courts to end the monopoly enjoyed by Rockefeller under his patent.

Andrew Carnegie, the iron master, was an inventor. His genius took the turn of inventing positions wherein to fit the employment of special talents that those talents might produce the greatest profits for himself. It is said by some that this genius is executive. In its truest sense it is inventive. All great executives have inventive skill.

It is in this meaning that Randolph & Co., the great patent attorneys and experts, are inventors. Every day they assist inventors, experienced and tyros, out of difficulties with their inventions; suggesting plans for perfection, inventing reasons for the issuance of patents, finding defenses for patents attacked in the courts. Theirs is a technical business, requiring knowledge of law and procedure, knowledge of inventions, intuitive perception of inventors' ideas, and technical skill in the presentation of the character and utility of an invention that the patent on it may issue in terms so broad as to prevent infringement.

All Americans are inventors. The Northwest winds have made this people inventive. Their minds are original, creative. It is typical of such a people, confronted with the innumerable physical problems incident to the development of a new and marvelously rich country, that their inventions have largely been of the class broadly described as mechanical. The country awaits further development. The forces of Nature must be yet more effectively harnessed to the wheels of Commerce that the greatest remuneration may be derived from least effort and that there shall be the least waste.

When his work is done inventive skill will turn to the finer arts. Books and paintings will take the place of plow and trowel. But who can tell what is to be the end of mechanical invention; who can tell when the commercial forces of Nature adapted to the uses of Man in the business world have been exhausted or developed to the highest attainable point?

Of over 1,000,000 patented inventions a considerable portion have been manufactured and placed on the market. No one knows or can know just how many. The number is beyond the imagination to grasp at once. Who can enumerate these, or one-hundredth part of them? Each has or has had its use or it could not have been patented.

It is something of a mystery, this working out of patents. Randolph & Co. have been at it for a long time.

"What has been patented?" they were asked.

"We do not know. No one knows, without investigation."

"What remains to be patented?"

"Everything. Anything. The Lord alone knows. It may be that nothing has been patented to what may be patented. These things that now are may, in 50 years, be compared in crudity to the things that were 100 years ago. Who knows? A new idea comes. A new invention is wrought. There is a revolution in business, in manufactures. New inventions follow the first invention to perfect the new system inaugurated by the first invention. There is an evolution in business methods. We are waiting."

Robert Fulton originated the steamboat. There are the Lusitania in commerce and Dreadnoughts in the navy as the development of that original. Franklin brought electricity from the clouds. Volta invented the battery. Faraday invented the dynamo. There followed the inventions of Edison, electric lighting, heating, motive power. Morse discovered the telegraph. There are a hundred messages going over a single wire at this time in opposite directions in the same flash. And Marconi needs no wires to transmit messages. He does it by electric waves.

It is a commercial age. Inventions worth while pay handsomely if properly protected by patents. It pays to be an inventor. Capital is waiting to exploit the useful. A man invented the hook and eye fasteners for clothing. It is a little thing. He made a fortune. The return ball attached to a rubber string, the delight of children, gave its originator a handsome competence. Howe and Singer sent forth sewing machines. Their descendants have princely estates. Mergenthaler built a typesetting machine. The profits have been enormous. A railroad engineer recently perfected a funnel to carry unburned carbon back to the locomotive firebox. The Pennsylvania Railroad, for which he worked, took his patent up under a $7,000,000 corporation, and the engineer got a large block of the stock besides, to him, undreamed of wealth in cash.

The rewards for inventive genius are greater at this time than any preceding time in the world's history. The people are looking for inventions. Something new appeals to the public with irresistible force. There is money to buy that which is desired and needed. It is the harvest time for inventors along all lines. They should invent for the homes; the mines; the farms, the mills and the forests.

Inventors should get from their inventions, from their thoughts, all the profits to which they are entitled, and they owe it to the world to bring forth their inventions. Randolph & Co. see to this end of the inventor's work.

It is their business and to it they have given a lifetime of study. In this way their inventive genius is tried out and it is a matter of pride with them that they can lead the inventor into a safe haven with his invention where the wiles of the infringer may not penetrate.

The greatest dreamer among all inventors cannot tell what remains to be invented. The inventor will say his greatest invention is yet to come. Edison said recently he had just begun his work, and hundreds of patents of great value have been issued to him. Perhaps he has ideas for as many more. Working unceasingly in his laboratory with the mysteries of the elements no one may forecast what he will discover or how he may convert his discoveries to the uses and comforts of man. What is Tesla doing? The inventor may guess at what remains to invent. He will come nearer than any one else in answering a problem that must remain unsolved through the ages.

The advice of Randolph & Co. to inventive Americans is to go ahead with their work. They may strike an invention worth while before any other man. They should perfect their invention, develop their thought to practical operation. It may be the invention is not new and not patentable. But the inventive mind will be broadened and strengthened and good will be done. New ideas will come, an invention will spring forth that will be of value. Failures are not bad if they lead to success. Seek for something new, something the people want. Cheapen the cost of living; reduce the hardship and increase the effectiveness of labor; add to the comforts of life; improve the conveniences of existence;

lessen the danger of accidents and disease, and fortunes are made.

Dirigible balloons and heavier than air machines are to be built that will solve the problems of aerial navigation from a commercial standpoint. The Wrights have done much but there is much more to be done. Wireless telegraphy is in its infancy. The telephones adapted to operation under the sea would be of great value. The South wants a cotton harvester; a peanut picker. The canner wants a machine that will not crush tomatoes, and a corn husking machine that will not bruise the corn.

Smoke consuming devices are needed in Pittsburgh and all over the Middle West, and a fortune awaits the inventor from sales in that section alone. A non-breakable lamp chimney will sell in any rural community. The newspapers are awaiting a substitute for forest wood pulp in paper making. A gun that will not emit flame will supplement and perfect the latest invention of Maxim, a noiseless gun. Devices that will prevent collisions on railroads, or minimize the dangers from fire at sea would be a boon to humanity. The railroads are seeking a practical substitute for wooden ties, and a coupler for rails that will contract as the rails expand and vice versa.

It is certainly possible to utilize the sun's rays for motive power, for stored heat and for cooking purposes, yet there is no invention of the present day doing this successfully. Invent shoes that won't wear out and still be comfortable; make a substitute for cloth for clothing that will be cheaper than the woolen clothing at ruling market prices. Get something to take the place of India rubber. Automobilists are looking for improved springs and cushion tires, and for a storage battery that will carry on endurance runs.

The manufacturer wants a method of producing energy directly from the combustion of fuel. The farmer will pay to know how to produce rain in seasons of drought. The housewife wants non-breakable china, and home conveniences that will help her solve the problem of no servant. The builder is trying to find a non-corrosive composition for drain pipes.

Edison suggests concrete architecture; moving picture machines in which the characters will talk as well as act; electric locomotives; new fertilizers for the farmers with a large percentage of nitrogen; and inventions for the utilization of water power by electricity. And then the little things. There is no end to the things that an inventive mind could frame up for another inventive mind to work out and adapt to practical uses. Necessity is the Mother of Invention. Study necessity—your own and your neighbor's, and practical ideas will spring up like mushrooms in the inventive mind.

The original purpose of the Patent Law was to promote the progress of science and the useful arts by encouraging the establishment of new manufactures. The first law was passed by Congress in 1790, or fourteen years after the Declaration of Independence, and the first inventor to take advantage of the law was Samuel Hopkins, who was granted a patent July 31, that year. A patent is the only form of monopoly recognized by law. It is a certificate of exclusive ownership. Against it the complaint of restraint of trade and impairment of the freedom of sales is unavailing. The Patent Law was drafted to encourage the development of ideas for the benefit of Mankind, the originator to reap all profits from them for a period of seventeen years.

Profits from inventions depend primarily on two things: First, the merit of the invention itself as meeting the wants of the public; and second the extent of control of the thing invented as determined by the wording of the specification and claims of the patent. For the material benefit to the inventor the later provision is more important than the former. The Government permits the inventor to draw his own contract and is mainly concerned to see to it that the invention is fully disclosed and that the claims are not broader than those to which the inventor is entitled.

Many inventions of great value to the public have failed to be of any money value to the inventor through failure to have the claims covering and protecting the invention properly drawn and his application properly prosecuted in the Patent Office. The courts are bound by the wording of the claims. Patents properly drawn will be respected without the necessity of suits for infringement. It is essential that those drawing the patent should have knowledge of the practice and procedure in the courts where suits for infringements are carried and patent rights are sustained, and of the leading divisions of those courts.

The study of patents and patent law has allured many men from the beaten paths of ordinary civil and criminal law into the less frequented but interesting and intricate practice of a profession that safeguards the rights of those who are in the vanguard of material and commercial progress. Their interest is in the complex question arising from scientific and applied mechanics, and the clarifying of those questions in simple and broad specifications for submission to patent examiners that their clients may reap all the rewards of their inventions.

Randolph & Co. are surrounded by an able, competent and well equipped staff and in all litigation, whether in the Patent Office or before the courts, clients of Randolph & Co. can rest assured that their interest will be protected by the best legal talent in a city that attracts the best from all parts of the country. But litigation while always possible, is infrequent when the attorney's original work is perfectly done as is the case here.

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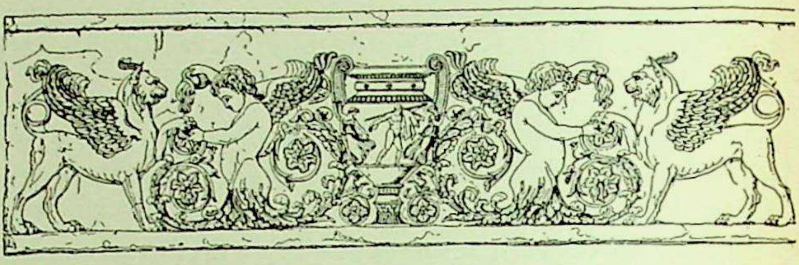
Many patents of distinct merit fail to return a profit simply because their owners are not in touch with men in various lines of industry, who would gladly either buy outright or work it on royalty.



Fortunes in Prizes Waiting to be Won

Reprinted from "Popular Mechanics" for April, 1913, by permission

[Every little while a report gains currency that a million-dollar prize has been offered for the performance of some impossible mathematical feat or the invention of some contrivance of problematical value. Many innocent persons have been deluded into spending their time and money in the pursuit of these phantom prizes. Feeling certain, however, that there must be many genuine prizes waiting to be won, "Popular Mechanics" Magazine communicated with the fifty-five foremost scientific organizations of America, the one hundred largest industrial and trade associations and the ninety principal learned societies of foreign countries. If there are any prize offers of value not disclosed in the information thus collected, the editor would be glad to learn of them.—EDITOR.]

A DOZEN fortunes, even as fortunes are reckoned today, are lying, in cash, in the treasuries of as many organizations, to be awarded as prizes to inventors, discoverers and scientists. Scores of lesser prizes, any one of which represents a splendid reward for a year or two of labor, lie unclaimed, waiting for the man who is able to fulfill the conditions of the gifts. Much of this prize money is the interest on inexhaustible funds, and is given annually or at other stated intervals. But much more of it is in single large amounts—$1,000, $10,000, $20,000, $25,000—even one great lump of $100,000 is waiting for the first person who can prove his claim to it.

There is $23,800 in Germany for the first person who presents a perfect proof of a well-known mathematical theorem. There is $20,000 in France ready to be given to any one who finds a cure for one of the commonest diseases. And, to get nearer home, there are sums ranging all the way down from $10,000 offered in America for mechanical devices that are sure to be invented sooner or later.

Largest of the prizes awaiting inventors is the $100,000 offered by the International Association of Recognized Automobile Clubs, for the best substitute for gasoline. This prize, which was announced last December, is to be given only for some product that can be used in existing internal-combustion motors, is available in large quantities and is of such a nature that it cannot be monopolized by a trust. Other conditions are yet to be announced. Here is a prize worth winning. Experiments with benzol, with methyl alcohol and with a mixture of the two, have encouraged inventors to work along those lines, but it is possible that some American will come to the front with a new volatile hydrocarbon, or with a satisfactory method of carbureting kerosene, that will capture the big prize. And the winner does not have to yield ownership in his invention to get the $100,000, but like most of the other prizes for industrial research, this prize is a bonus, not purchase money.

Should the new fuel, when found, be capable of manufacture from some substance produced in Great Britain, there is another prize ready for the fortunate inventor, the 2,000 guineas ($10,500) offered by the British Society of Motor Manufacturers and Traders for a fuel that meets this condition. The Royal Automobile Society of England will conduct tests of all fuels offered for this prize.

Along the same line of automobile improvement is an opportunity to win $2,500 by a simple mechanical invention. This sum will be paid by the Royal Automobile Society of England for the best carburetor, the fund having been placed in the society's hands by Mr. G. K. Chamberlain, an American. This contest is open, like the others mentioned, to inventors of all the world.

The largest standing prize in America for an invention is one of $10,000 for a machine for pulling and topping sugar beets, offered by the Great Western Sugar Company of Denver. The successful device must require comparatively little power and if operated by horses not more than four horses per beet row. It must pull and top all the beets, separate the beets and tops and leave all convenient to load. It must be adjustable and salable at retail for not more than $300, if horse-drawn, or $500, if self-propelled. If not won by March 1, 1915, the prize may be withdrawn, but the first device offered before that date that fulfills all the requirements will get the prize—and the inventor will retain the ownership of his invention.

Fifteen years ago the Louisiana Sugar Planters' Association offered a prize of $2,000 for a sugar-cane harvester. Thus far none has been produced that meets all the requirements, and the prize offer has lapsed, but many inventors are at work on this line, and, as the secretary of the association writes, "whoever makes a successful cane harvester will become a millionaire very quickly, and will not need the $2,000."

The effort to convert coal waste and low-grade coal into briquettes and so utilize it economically has occupied the attention of many inventors for years. The government of New Zealand recently announced the offer of a prize of £250 ($1,250) for a more economical process of making briquettes from slack coal.

One of the largest sums available for the reward of inventive genius and application is the Pollock Prize Fund of $50,000, held by the Conservatory of Arts and Trades of Paris, to be distributed in prizes for inventions of saving life at sea. This fund was founded by the daughters of Mr. and Mrs. Anthony Pollock, of Washington, D. C., who were drowned when the French ship "La Bourgoyne" sank off the Grand Banks on July 5, 1898. Several awards, mostly of small amounts, have been made from the fund for life-saving devices, which are on exhibition in a special room at the conservatory, but there is still nearly $30,000 available for the reward of inventors of meritorious apparatus. The largest single award that has been made from this fund, $20,000, was given by the jury in 1900 to L. Colineau for the plan of constructing the "bridge" of a steamship in the form of a detachable steel barge with water-tight compartments, 40 ft. wide and extending in length the entire width of the ship.

One of the largest prizes for the protection and preservation of human life is the sum of 25,000 marks ($5,950) for the invention of an electric miners' lamp combined with a dependable device to indicate the condition of the air and give warning of the presence of a dangerous amount of explosive gases. This prize is offered by the mining interests of the Dortmund district in Germany.

Comparatively small in amount, but important because of the scientific recognition which any award by the Royal Society of Arts of Great Britain carries with it, is the prize of £20 ($100) it offers to the inventor of the best portable apparatus for enabling men to undertake rescue work in mines. The winner of this prize will be allowed to choose between the money and a gold medal. The fund from which it is provided was established in 1813 by Anthony Fothergill.

The American Red Cross has at its bestowal one prize of 6,000 roubles ($3,100); two prizes of 3,000 roubles ($1,550) each, and six of 1,000 roubles ($515) each, to be awarded, from a special fund created by the Empress Maria Feodorovna of Russia, for devices and apparatus for the amelioration of the sufferings of the sick and wounded in time of war. The American Red Cross also awards annually the William Howard Taft prizes of $50, $25, $15 and $10, given to railroad men for services and devices for the prevention of accidents.

A certain machine in general use for splitting leather is productive of many serious accidents. A prize of $100 is offered by the National Association of Tanners for a safety device for this machine.

A prize for scientific achievement that is well worth winning is the Pierre Guzman prize of 100,000 francs ($20,000) offered by the French Academy of Sciences to the first person who succeeds in establishing communication with some planet other than Mars. Apparently the French savants believe we are to be "wirelessing" to Mars in the not far distant future!

Somewhat easier to win, at first glance, though the problem for the solution of which it is offered has baffled men of science for more than two hundred years, is the Wolfskehl prize of 100,000 marks ($23,800) offered by the Academy of Sciences of Goettingen, Germany. All one needs to do to get it is to prove to the satisfaction of mathematicians generally that Pierre Fermat was right when he wrote, in a letter of October 18, 1640, that no integral values of x, y and z can be found to satisfy the equation "$x^n + y^n = z^n$" if "n" is an integer greater than 2. That's all—just prove he knew what he was talking about and collect that $23,800! Fermat was a tax collector who pursued pure mathematics as a hobby, and his letters, published after his death in 1665, contain original contributions to the theory of numbers which prove him to have been one of the greatest mathematical geniuses that ever lived. A hundred years after Fermat's death a German savant demonstrated the correctness of all but two of the Frenchman's mathematical deductions. One of the remaining two is known in the world of science as "Fermat's Last Theorem," and a fortune awaits the first to prove Fermat right. Dr. P. Wolfskehl, of Darmstadt, died in 1907 and left 100,000 marks for this purpose. The mathematicians of the entire world are concentrating upon the effort to win it. Not long ago a convict, released on parole from the Missouri State Penitentiary, announced that in his seven years of imprisonment he had demonstrated Fermat's Last Theorem and was going to get the prize. A University professor of mathematics is said to have resigned his position to devote his time to the effort to win the Wolfskehl prize, and thousands of other mathematicians are at work on the problem. If no one wins the prize by September 1, 2007, the conditions of the award may be changed. Part of the accumulated interest of the fund was awarded a year ago for a partial demonstration.

Here is another brain teaser. "What is the expression of the C. Neumann theorem in the theory of the Newtonian potential, applied to the oval-shaped solid derived from the ellipsoid by the method of reciprocal radii?" Answer that correctly and the Prince Jablonowski Society of Leipzig, Germany, will give you a prize of 1,500 marks ($357) if the solution is the best one received before October 31, 1913.

Mathematical problems are favorites among prize-giving societies of Europe. The Paris Academy of Sciences offers a long list of awards, headed by the Jean Reynaud prize of 10,000 francs ($2,000), given every five years for the most notable work in mathematics. In 1913 this society will award also the Petit d'Ormay prize of 10,000 francs for the best contribution in pure and applied mathematics, seven other prizes, aggregating 16,240 francs, for original work in higher mathematics, and the Wilde prize of 2,000 francs for the most important contributions to science in the preceding two years. In 1914 the Paris Academy will give a prize of 3,000 francs for the best solution of a certain problem in trigonometry, and in the same year will award the Fourneyron prize of 1,000 francs for the best theoretical and experimental study of turbines.

The Royal Academy of Science of Belgium offers, for 1913 and later, two prizes of $200 each, and one of $240, for work in higher mathematics; a prize of $280 for the best paper relating to public works offered before June 30, 1913; a biennial prize of $200 for discoveries in physiology, a triennial prize of $360 for original work in general biology, a prize of $480 every six years for contributions to political economy and social science, and one of $300 every five years for the best treatise on spiritualistic philosophy based on pure reason.

A prize of $1,000 is waiting in Philadelphia for the first resident of North America who shall determine by experiment whether the invisible rays of light below the spectrum, known to science as "infra-red" rays, are of are not transmitted with the same speed as other light rays. This Boyden Premium was established by Uriah H. Boyden, of Boston, in 1859, and placed in the custody of the Franklin Institute of Philadelphia, to be given to any one who would determine the relative speed of all the invisible light rays, but in 1907 part of the fund was awarded for the discovery of the relative speed of the visible rays and those above the spectrum—the "ultra-violet" rays of the scientists.

Every three years there is a chance for students of electrical science to win $4,500. This is the interest, at 3 per cent, on a fund of $50,000 deposited with the Montefiore Association of Liege, Belgium, by George Montefiore Levi, given for the best original work on scientific advancement and the progress made in technical applications of electricity.

A cash prize of no fixed amount is given every five years by the Royal Society of Sciences and Arts of Gothenburg, Sweden, for an important scientific discovery. The Royal Society of Edinburgh offers the Keith prize of a gold medal and $200 to $250 for the best communication on a scientific subject received before the end of its 1913 session. It also offers biennially the Makdougall-Brisbane prize of a gold medal and a sum of money for an essay or paper having references to any branch of scientific inquiry, whether material or mental.

Leaving out of consideration hundreds of prizes open only to members of particular organizations or inhabitants of certain countries, the list of important or curious prizes offered in Europe is still a long one. One that is not to be awarded until 1931 consists of £71.6/10 ($356.71) in British "consols" or government bonds, deposited by Sir Frederick Bramwell with the British Association for the Advancement of Science and to be given by them 18 years hence for a paper dealing with the whole question of the prime movers of 1931 and especially with the then relation between steam engines and internal-combustion engines.

Largest of the standing rewards offered for medical research is the Breant prize of 100,000 francs ($20,000) offered by the medical section of the French Academy of Sciences for the discovery of a means to cure Asiatic cholera. The entire sum will be given to the discoverer of a genuine cure, but the interest may be awarded from time to time in smaller prizes for work advancing the scientific knowledge of this disease.

The largest American award for medical research is the cash prize of $1,000 offered every three years by the College of Physicians of Philadelphia for an important contribution to medical science. The same institution awards annually the Alvarenza prize of $180 for medical research. The Harvard Medical School gives two Boylston prizes, of $75 each, annually, for original research in medical science.

Every two years some young architect or architectural draftsman gets the Le Brun Traveling Scholarship of $1,000 with which to spend six months in European study, offered by the New York Chapter of the American Institute of Architects. Every year the National Association of Sheet Metal Contractors of the United

States gives $300 in cash, tools and books to journeymen and apprentices for ability in sheet-metal work.

The British Royal Society gives $500 every five years for works on jurisprudence, from a fund established in 1844. An annual distribution of $2,000 is made by a Chicago manufacturing company for essays on economic subjects. The American Historical Association gives every two years the Justin Winsor prize of $200 for independent research in American history and the Herbert Baxter Adams prize of $200 for original work in European history. The Boston Society of Natural History gives two prizes of $50 each every year, the Walker prizes, for essays on subjects selected by the society. And an annual prize of $20 for inventors is derived from a legacy left many years ago by John Scott, of Edinburgh, in the hands of the Philadelphia Board of City Trusts.

Greatest of all of the periodical money prizes, but not subject to competition in the ordinary sense, are the five Nobel prizes of about $40,000 each, awarded annually from a fund left by Alfred Nobel, inventor of dynamite, to the persons who have rendered the greatest service in physics, chemistry, literature, medicine and peace. The Swedish Academy of Sciences awards the first two; the Swedish Academy, the third; the Caroline Institute of Sweden the fourth, and the Norwegian Storthing, the last-named. Two Nobel prizes have come to America—a peace prize to Theodore Roosevelt for his services in ending the Russian-Japanese War, and a prize in medicine to Dr. Alexis Carrel, of the Rockefeller Institute of Medical Research.

Pages could be filled with the list of American and European offers of medals for invention, research and discovery. Oldest of these American trophies is the "Magellanic Gold Medal," an oval plate of solid gold of the value of ten guineas ($50) given annually by the American Philosophical Society of Philadelphia, from a fund founded in 1786 by John Hyacinth de Magellan, of London, for the best discovery or most useful invention relating to navigation, astronomy, or natural philosophy.

To gain the Albert medal of the British Royal Society is probably the highest honor that can come to an inventor or scientist, while the John Fritz medal is the most notable American reward for research and invention. Two Americans, Edison and Bell, have each received both medals.

Such are the prizes the world offers for creative work. Fortune as well as fame is more than ever before the reward of research and industry.

* * *

Some inventors receive large sums for apparently insignificant patents while others who have more meritorious patents allow them to lie dormant.

A good sum of cash in hand for a patent is often more desirable than to wait for conditions to change or other inventions to supplant it.

CHAS. H. CONSOLVO.
LIEUT-COLONEL & PAYMASTER
GENERAL.

Office of the
Paymaster General
Virginia Militia
Norfolk, Va.,

April 14th, 1913.

To Whom It May Concern:

Messrs. Randolph & Co., well-known Patent Attorneys of Washington, D. C., have adopted methods for the promotion of the best interests of inventors which appeal strongly to me.

Their excellent business principles applied to a profession have won public confidence. I am pleased to note well deserved success as a result of the appreciation from satisfied clients.

Many broad patents are constantly being granted to inventors who fail to secure proper financial backing to place them upon the market. Messrs. Randolph & Company's plan for bringing the investor, manufacturer or capitalist in touch with inventors, after patent has been secured, is certainly a great advantage to all inventors.

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Very truly yours,

CHAS. H. CONSOLVO,
Paymaster Gen'l Va. Militia.

Washington City Post Office
OFFICE OF THE POSTMASTER

January 22, 1913.

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It gives me pleasure to state that I am acquainted with the firm of Randolph & Co., of this city, and know them to be gentlemen well qualified to properly serve their clients relative to patent business.

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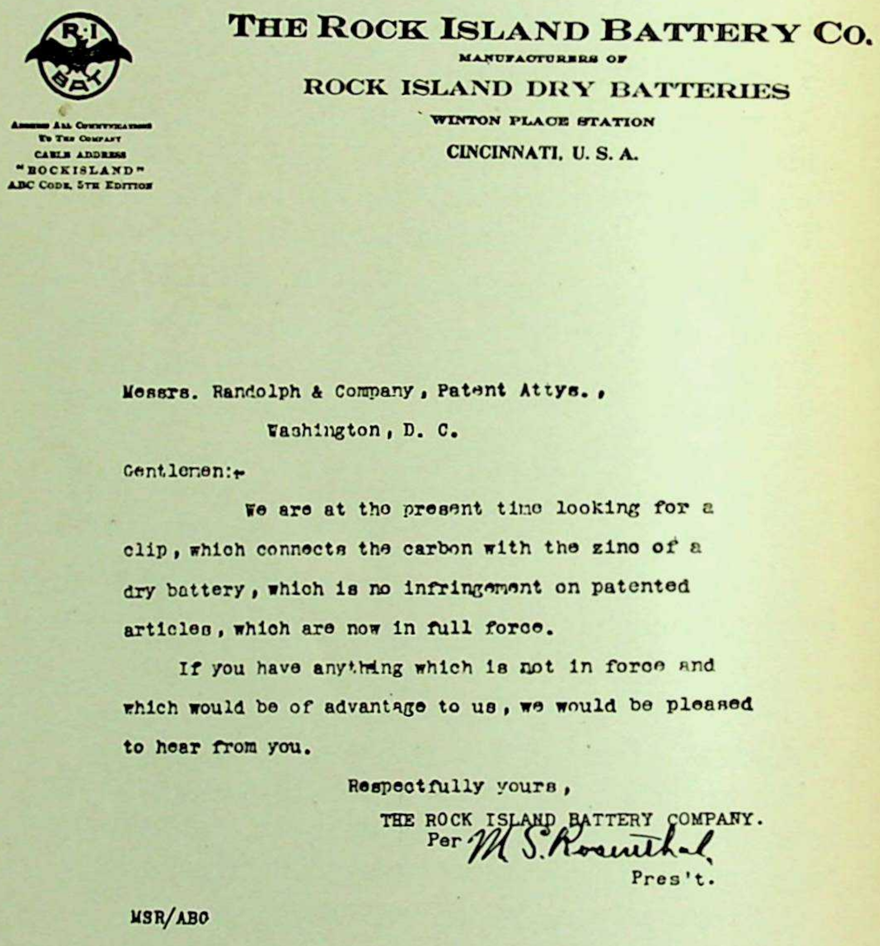

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MANUFACTURERS OF
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CINCINNATI, U. S. A.

Messrs. Randolph & Company, Patent Attys.,
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Respectfully yours,
THE ROCK ISLAND BATTERY COMPANY.
Per M. S. Rosenthal
Pres't.

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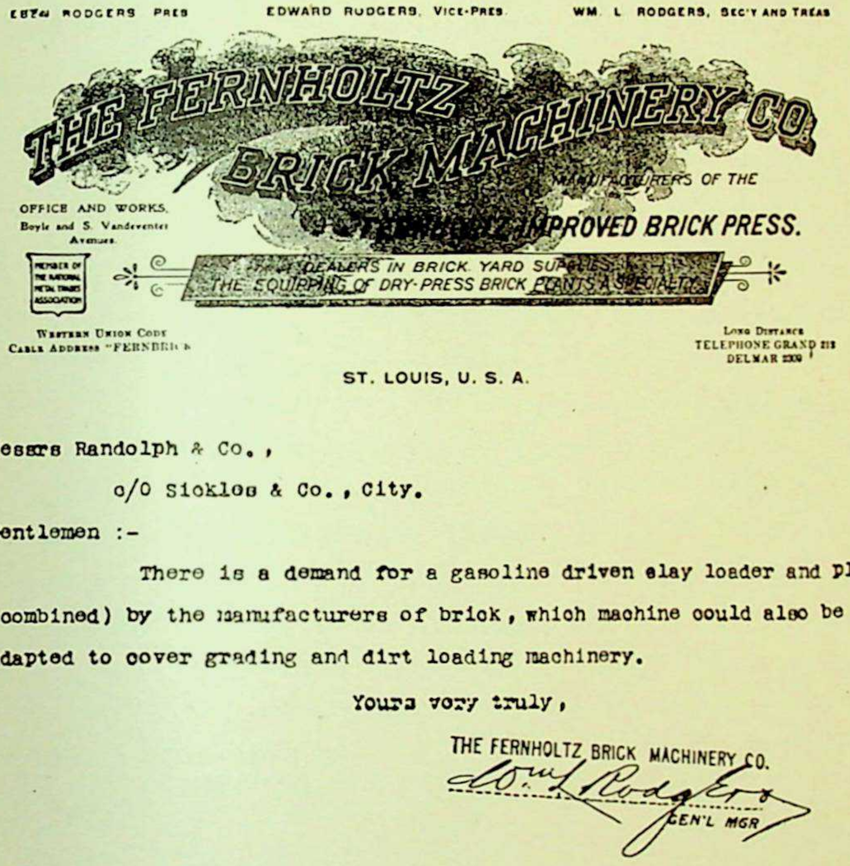

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Yours very truly,

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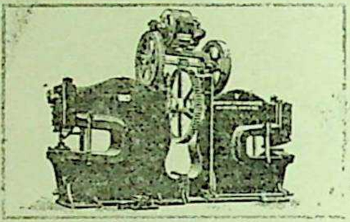

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July 25, 1913.

Messrs. Randolph & Company,
Patent Attorneys,
Washington, D. C.

Gentlemen:-

We note your special bulletin, and would say if at any time you have any good patents in the line of machinery requiring cast iron we should be glad to consider same. Something of medium weight, any where up to one ton, would interest us.

Very truly yours,

COVINGTON MACHINE COMPANY.

Wm Sangster

WS/McD.

ADDRESS ALL COMMUNICATIONS TO THE COMPANY

IMPERIAL DRUG COMPANY,
INCORPORATED.
BALTIMORE, MD.

OFFICE AND LABORATORIES
936 N. MADEIRA STREET

October 24, 1912.

TO WHOM IT MAY CONCERN:-

The Patent Sales Department of Messrs. Randolph & Co., who stand high in their profession, has proven a great boon to inventors. This progressive firm of patent solicitors has originated a very simple but effective patent selling system which is being extended to all parts of the world and offers great opportunities to sell patents to great advantage not only in this country but abroad.

They are deserving of every confidence and I recommend their methods to the public.

Yours very truly,
Imperial Drug Company Inc.
President.

Dic. G./B.

SCIENCE AS A KEY TO WEALTH

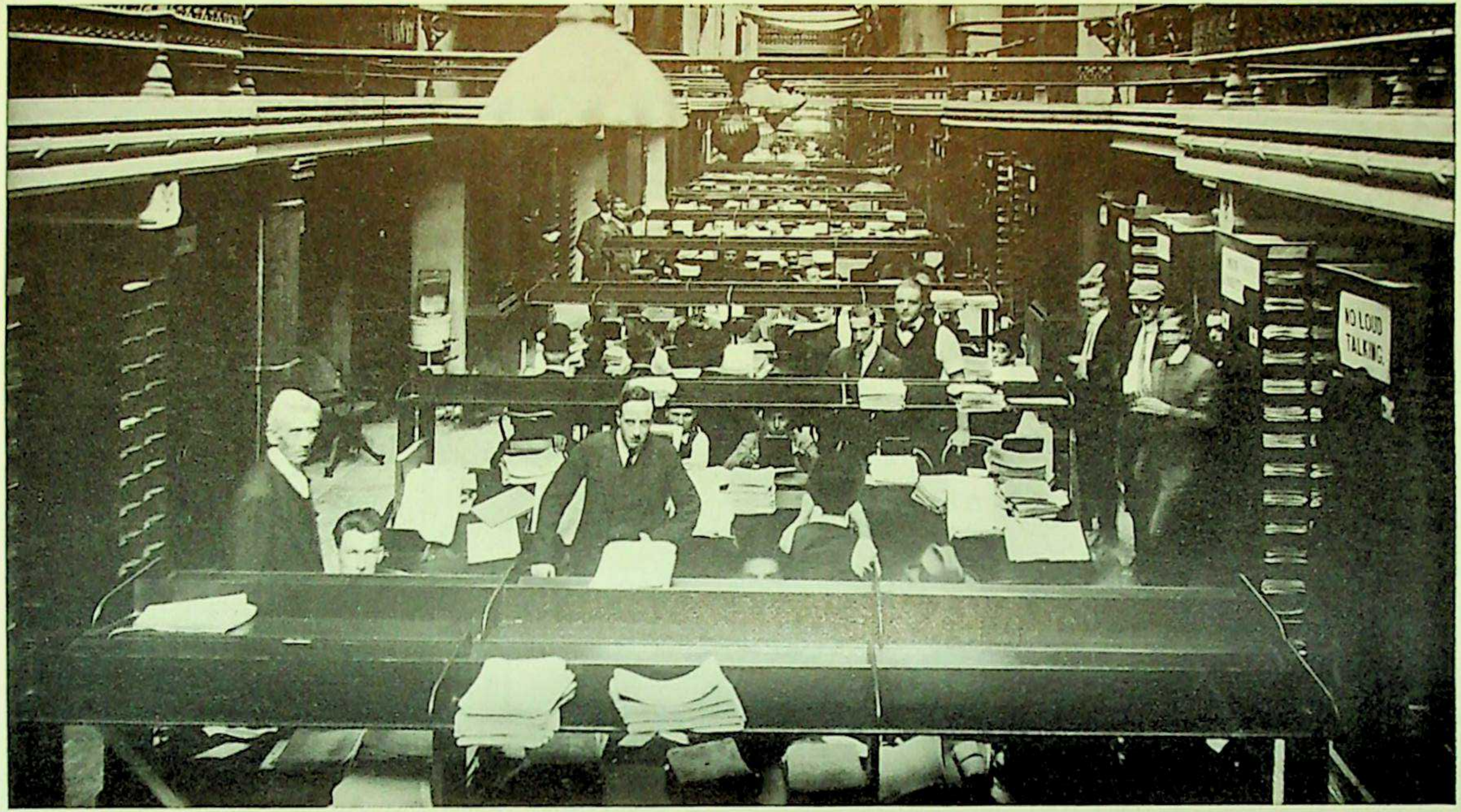
HOW IDEAS AND INVENTIONS WORKED OUT IN THE STUDY AND THE LABORATORY HAVE BEEN CAPITALIZED IN THE WORLD OF BUSINESS

By ISAAC F. MARCOSSON

Reprinted from
MUNSEY'S MAGAZINE

ONE of the familiar and pathetic pictures of human-interest narrative is that of the unpractical inventor who sells his mechanical birthright for a song, or who sacrifices his years and his substance upon the ungrateful altar of scientific research. Unhappily enough, this touching spectacle has been seen in many actual cases, and it has helped to create a widespread impression that genius needs a guardian or a business manager.

As a matter of fact, the average scientist or inventor who has really benefited the human race has had, in the main, a fairly keen sense of commercial values. It has simply been part of his larger equipment. A man who is notably successful in one line of practical endeavor would usually have been successful in others. It is quite conceivable that Mr. Morgan might have been another


NO LOUD TALKING.

Searchers in Attorney's Room Searching Records of U. S. Patent Office.

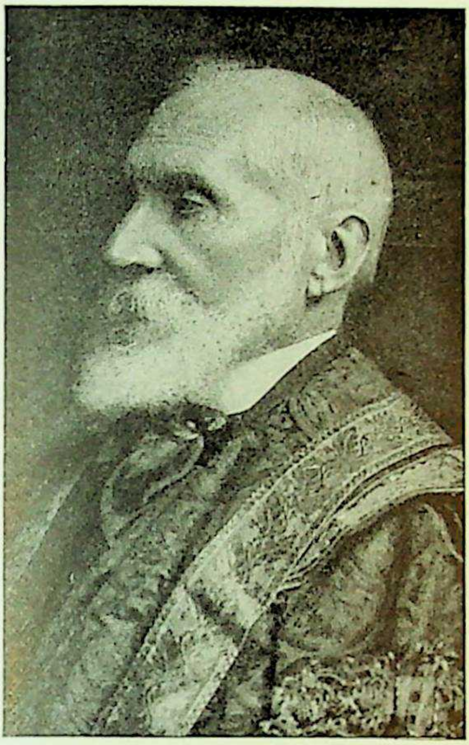
Disraeli had he devoted himself to statesmanship, and that Mr. Harriman might have gone down in history as a great general had he chosen the profession of arms. Mental power has a more or less universal application.

The scientist's ability to grasp the practical importance of his device or discovery has fed the enthusiasm that kept him close to the investigating trail. Some inventors, it is true, have reaped no adequate reward, but many have garnered fortunes. You can match every Ericsson with a Bessemer and every Whitney with a Kelvin.

Most successful inventors have been too busy to combat the theory that because a man happens to be gifted with the genius of creation he must of necessity forswear all pretense to practicality. The creative and the commercial faculties may go hand in hand. You have only to look at the millions that stand in the name of Bell and Agassiz and even Edison to find significant modern instances.

Of course there was a time when the man of research was a sort of public charge. He was regarded as an aloof and distinctive figure and the State was supposed to owe him a living. Learning had little to do with the practical affairs of the world. Like the art of the painter or the poet, it lived largely on the patronage of the great and the rich.

The beginning of the end of this idea came with Francis Bacon. His splendid genius dispelled some of the unpractical gloom that had hung about the scholar. He sounded the thrilling key-note of scientific research—that the progress of man must come by his conquest of



LORD KELVIN (SIR WILLIAM THOMSON), THE FAMOUS ENGLISH PHYSICIST WHO WAS EQUALLY SUCCESSFUL AS A SCIENTIST, AN INVENTOR, A TEACHER, AND A BUSINESS MAN

From a photograph by Lafayette, London

nature. He reared the first great outpost of original investigation. That he paid dearly for it most people know, because he caught a fatal cold while making a somewhat crude experiment with refrigeration—observing a dead fowl which he had out in the snow.

In Bacon's day, of course, practical science was in its feeble infancy; but every subsequent cycle of scientific and inventive enlightenment—each with its miracle of heat or power or light—has been marked by the material success of some of the illuminating minds that have made their age their own.

When you come to analyze the careers of the very successful men of science and invention—and especially the latter-day examples—you discover, as a rule, that their way to fortune was due to one of two things.

The first is a natural commercial bent, such as was evidenced by Lord Kelvin, one of the shrewdest and most practical of men. His feat in marketing his improved compass would in itself have singled him out for rare business distinction.

The second is an ability to learn from the teaching of experience—as happened, for instance, with Sir Henry Bessemer, who found that he had been too confiding and altruistic with his first invention, and reaped the usual reward of excessive faith in the gratitude of governments. But like the wise man that he was, he never again allowed himself to be taken advantage of and he became a millionaire.

I might add a third factor, of which Mr. Edison has perhaps given the most conspicuous example. It consists of choosing the right kind of associates to form a bulwark against the nightmare of the inventor—which is infringement—and to give the investigating mind immunity from the frets of finance. It is scarcely necessary to add that this method closely resembles Mr. Carnegie's favorite formula for success.

One great aid to the success of the inventor has been the tremendous increase in the scope of business. The world, as it has expanded, has cried out for new devices and new conveniences. New lands, new climes, new activities—a whole vast new civilization—have united to stimulate and to reward man's ingenuity. The originating mind has not been compelled to waste its time in hawking the fruits of genius. Capital lies in wait at the laboratory door, and the ear of militant commercial expansion is attuned to the whir of the pioneering lathe.

You find men like Westinghouse, Edison, Marconi, and Parsons entrenched behind millions, secure in the knowledge that their inventions—conceived and devised to promote progress and facilitate human uplift—will not know the pinch of adverse and discouraging circumstance.

In addition to all this, a new conviction has come to the inventor and the scientist. He is no longer ashamed to be called a "man of business." Rather is he proud of the accomplishment. And to business itself there have come a fresh dignity, a glamour of science, a place among the so-called arts. It lies at the base of all activity.

Now you can appreciate the pathos of that famous line by James Watt, the chief inventor of the steam-engine, written to the friend who rescued him from ruin:

> "Of all things in life, there is nothing so unprofitable as invention."

THE CASE OF SIR HENRY BESSEMER

Run the roster of scientific men who have become rich, and you discover an embarrassment of instances—so many, in fact, that only a few cases can be used here for the purpose of illustration. Take one particularly notable case—that of a man whose name is commemorated wherever a locomotive rushes along the ringing rails, wherever the hand of the builder swings a piece of steel skyward. Sir Henry Bessemer amassed a fortune of more than a million pounds.

The incident that lay at the root of his riches, and changed him from dreamer to hard man of affairs, happened shortly after he came to London, at the age of twenty, to make his way in the world. His first work was in die-making. He discovered that the government was losing large sums of money each year by the fraudulent use of stamps. Old stamps were used again and again. Bessemer thereupon perfected a die which made a stamp that could not be transferred from one document to another.

He had sweated out his idea through stress, toil, and privation. He was engaged to be married; and now he saw a competency and a home looming before him. Full of elation, he went to the stamp officials, who were so much impressed that they accepted his device, and offered him the post of superintendent of stamps, at a good salary.

A few days later, when he was telling his fiancee of his success, she remarked:

"If all the stamps had a date put on them, they could not be used again without detection."

It gave the young inventor a fresh idea. Despite the fact that it would undo part of his arduous work, he reshaped his invention. When the government officials received it, they were more enthusiastic than before; so much so that they discarded the original device and abol-

SIR HENRY BESSEMER, THE ENGLISH METALLURGIST AND INVENTOR, WHOSE EPOCH-MAKING PROCESS IN STEEL MANUFACTURE MADE HIM A MILLIONAIRE

From a photograph by Elliott & Fry, London

ished the office of superintendent of stamps. The ingenious young man, who had placed his faith in the appreciation of his country, found himself out in the cold.

Bessemer had not taken the precaution to cover his invention by any patent; he had no redress. In speaking of the affair he once said:

"I could not go to law even if I wished to do so, for I was reminded, when pressing for mere money out of pocket, that I had done all the work voluntarily and of my own accord."

It is only fair to the British Government to say that some years afterward, when Bessemer laid his case before Lord Beaconsfield, he was knighted as a tardy recognition of his service.

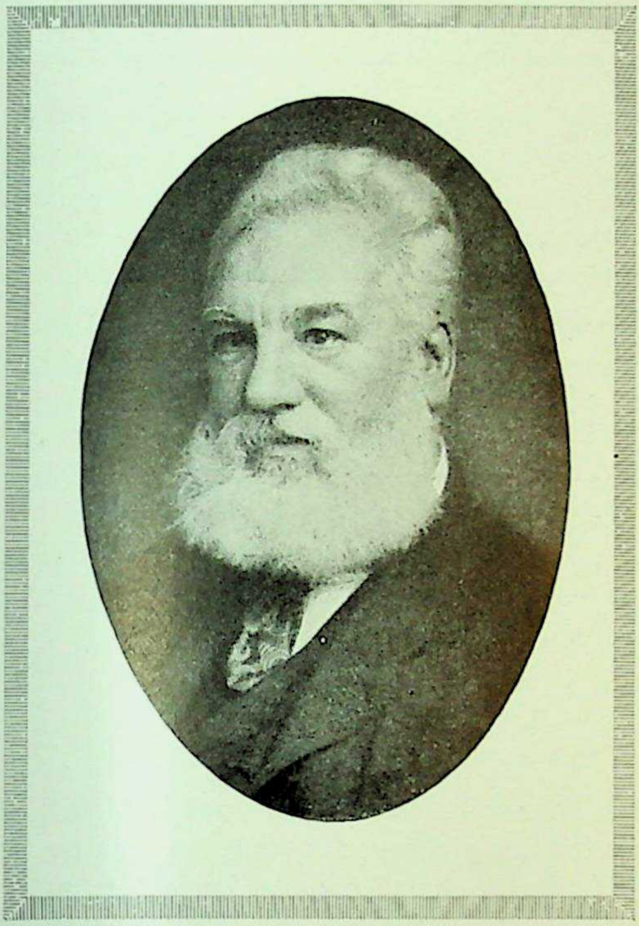
Not every one knows how to profit by costly experience. Bessemer did. When years of successful experimentation in velvet-stamping, glass-making, and sugar-refining had put him in the line of big results, and he finally perfected the epoch-making process in steel manufacture which bears his name, he took no chances. He slapped enough international patents on it to cover every possible detail and emergency, and they were so secure that nothing could dislodge them. He took these precautions in the face of jest, ridicule, and every other artifice known to the enemies of the advanced idea that upsets old traditions and makes a man a pathfinder in his vocation.

In the prime of his marvellous success, when his name was synonymous for the dawn and development of a whole new empire of industry, people would praise Bessemer's business foresight. But he would almost invariably tell the story of the die fiasco, and say:

"That's the thing that put it in me!"

THE WEALTH OF EDISON

Now turn to Thomas A. Edison, and see an entirely different kind of practicality. Perhaps no American



ALEXANDER GRAHAM BELL, INVENTOR OF THE TELEPHONE, WHOSE ORIGINAL PATENT WAS THE MOST VALUABLE EVER ISSUED IN ANY COUNTRY

From a copyrighted photograph by Pach, New York

name is better known all over the world at the present time.

The average citizen who uses his incandescent light, hears his phonograph, sees his moving pictures, rides on his electric cars, or is affected in some way by the extraordinary activities which have emanated from his marvellous brain, concludes that Mr. Edison's revenues must be nothing short of fabulous. As a matter of fact, while he is a rich man, he is not the multimillionaire that he might have been had he been a mere money-maker. He has made money in spite of himself, and by the aid of the brilliant and watchful coterie known as "the staff."

Edison did not begin by being a practical man. That was shown when he got his first stake, a check for forty thousand dollars paid him by General Lefferts for his stock-ticker. He had never received a check before, and when he shoved it through the teller's window at the bank it was handed back to him.

In dismay he rushed back to General Lefferts, and said he was afraid the check was no good. The General discovered that Edison had failed to indorse it. Of course, the paying-teller might have told him this, but it seems he realized that he was dealing with a green hand, and wanted to have some fun with him.

When Edison went into business for himself, he had an amusing experience. He kept no books. He had two hooks in the shop. On one he jabbed all the bills and accounts that he owed; on the other he kept his memoranda of items owing to him. When bills came due, he gave notes. When these in turn matured, he hustled around and got cash advances on orders.

One day he hired a bookkeeper, who reported that the shop was three thousand dollars ahead of the game. Edison was so much delighted that he gave a supper to some of his men to celebrate the event. But two days later, going over the accounts again, he found out that instead of being to the good, he was really five hundred dollars in debt.

Yet out of such absurdly amusing episodes grew the colossal business which bears the name of the wizard, and which represents, in all its world-wide branches and ramified activities, an investment of nearly seven billions of dollars and a gross annual income of more than one billion dollars.

Mr. Edison has not directed any of these enterprises financially. He has always been content to be free to pursue his investigations. He has said, too, that he never made a cent out of his patents in electric light and power—two branches, by the way, in which others have made many millions. But he has had the gift of picking the right men to handle his affairs; and this, according to the richest of all steelmasters, represents the instinct indispensable to successful business.

Nor must you get the impression that Edison is lacking in practical sense. His ability in this direction is best summed up by one of his closest associates;

"Mr. Edison's commercial strength manifests itself in the outlining of matters relating to organization and broad policy with a sagacity arising from a shrewd perception and from an appreciation of general business requirements and conditions; to which should be added his intensely comprehensive grasp of manufacturing possibilities and details, and an unceasing vigilance in devising means of improving the quality of products and increasing the economy of their manufacture."

Thus he is possessed of those qualities on which the whole great science of modern business is reared, for we have come to the era of standardization and organization. These, combined with economy of output, are the things that make the formula of manufacturing success.

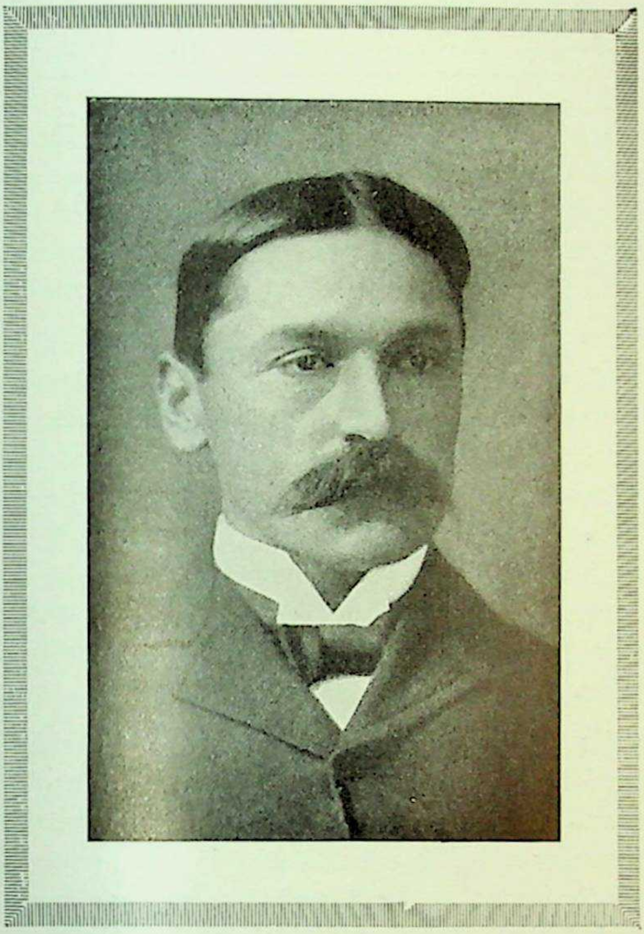
THE ACUMEN OF AGASSIZ

For downright business sense and native ability to capitalize scientific knowledge, Professor Alexander Agassiz stands alone. He has given to science perhaps its most successful commercial tradition. Practically single-handed, he put through a vast market project, and he had the courage and the discretion to hold fast to what he had in the face of all those temporary depressions and vicissitudes to which even the best mining propositions are heir. The result is that today the name of Agassiz stands high on the roll of millions.

Though it is an oft-repeated tale, the story of Calumet and Hecla always remains fascinating, because it has the glamour of dramatic discovery about it. Its romance has been exploited at the cost of its purely business side.

Professor Agassiz was the son of a famous scientist, and himself a geologist of note. While hunting specimens in the Michigan woods, he came across a prospector who had found a marvellous piece of copper ore. His knowledge of mineralogy told him that this piece of rock was the sign-board of a vast fortune, and he paid liberally for the specimen and the site from which it came.

To realize upon his find, he followed the best rules of the business game. He did not herald his discovery with a brass band. Going back to Boston, he interested a few people who represented the aristocracy of the



PROFESSOR MICHAEL I. PUPIN, OF COLUMBIA UNIVERSITY; AN INVENTOR WHO HAS PROVED TO BE A MASTER OF BUSINESS

From a photograph by Pach, New York

community, and whose names gave the enterprise solidity, integrity, and, best of all, confidence. He put his entire family into the enterprise, and they have dominated it ever since. The most experienced mining promoter could not have done better; yet this was achieved by a man whose forebears and whose own life had been dedicated to pure science.

The case of Professor Alexander Graham Bell is akin to that of Edison. He is generally regarded as a wealthier man than the Wizard of Llewellyn Park. This is possibly due to the fact that he has concentrated upon one great invention of universal service, which he has practically controlled.

In business matters, Professor Bell has been shrewder than Edison. At the age of twenty-nine, when he received that far-famed patent No. 174465, the most valuable single patent ever issued in any country, he followed the example of Sir Henry Bessemer by copper-riveting it with every possible buttress. This is why it stood such a terrific broadside of attacks, and proved invulnerable even to the assault of the powerful Western Union Telegraph Company.

Like Professor Agassiz, the inventor of the telephone kept his fortune in his family, and it was done in a very tender and sentimental way. While he was wrestling with those inarticulate sounds which were soon to burst forth as the voice of the telephone, he was wooing the beautiful Mabel Hubbard, daughter of Gardner Hubbard, his first and devoted patron. On the day of their marriage, he presented his bride with his share of the original Bell stock—a princely dowry that has reaped a harvest of millions.

While not blind to the practicalities of life, Professor Bell has always been frank enough to admit that the integrity of the Bell fortune has been largely conserved by the loyalty of his associates. That masterful group of men included Hubbard, who introduced the telephone; Thomas Watson, who constructed it; Thomas Sanders,

GUGLIELMO MARCONI, WHO LED BOTH IN THE INVENTION AND IN THE COMMERCIALIZATION OF WIRELESS TELEGRAPHY

From a copyrighted photograph by Pach, New York

who financed it; James Storrow and Chauncey Smith, who fought its legal battles; and, last but not least, the brilliant Theodore Vail, who unified it into a vast and world-wide commercial proposition that added fresh distinction to the achievement of American business.

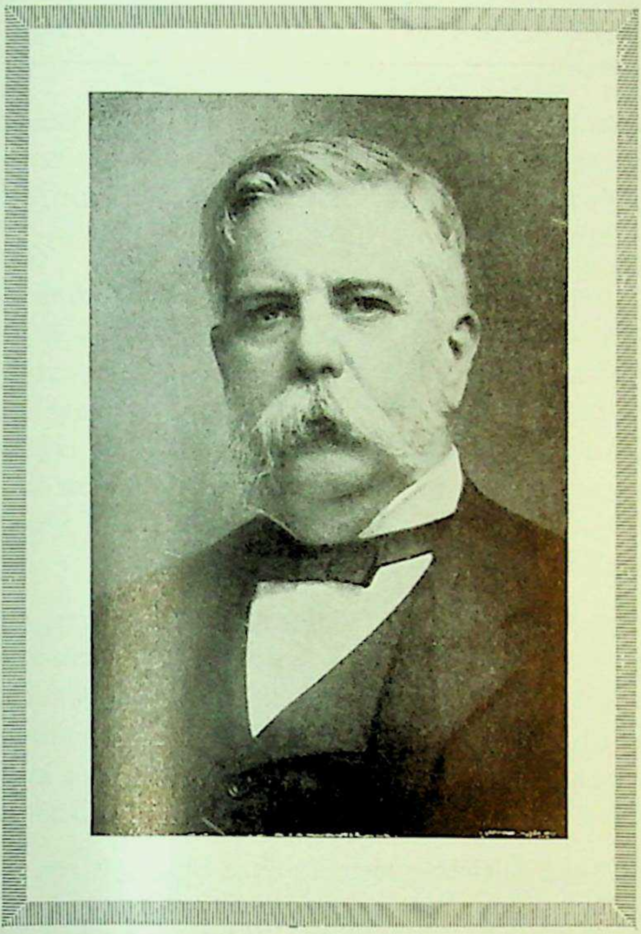
There is much difference of opinion in the business world about the native financial ability of George Westinghouse. There are those who claim that the temporary setback which his interests received during the panic of 1907 was due to his belief that he was as great a financier as he is an inventor. Be that as it may, he is a millionaire who has enriched many men besides himself, and a brief resume of the principal activity of his life reveals the fact that somewhere in his system is a pretty well-defined sense of practical proportion.

When Mr. Westinghouse invented the airbrake, he was a mere boy, and had neither the money nor the influence to put it on the market. This was in 1867. Yet by 1874 the Westinghouse Air Brake Company had been established for five years, and was making such headway that the inventor was able to go to Europe to introduce his device there. Before Mr. Westinghouse was thirty years of age it had made him a million dollars.

Perhaps the greatest proof of his business ability lies in the remarkable fact that his company, which has controlled the airbrake for forty years, is the one concern in its field that does not pay a dollar of royalty to any one. Here is another conspicuous example of an inventor who had the foresight to concentrate, and to keep to himself the product of his genius.

WHAT A RUNAWAY SERB BOY DID

For an admirable example of the scientist with a keen nose for business and a well-defined practical genius, you have only to go with me for a moment up to those imposing heights in New York where Columbia University rears its variegated structure. In the director's room of the research laboratory you will find a big, broad,



GEORGE WESTINGHOUSE, WHOSE AIR-BRAKE MADE HIM A MILLIONAIRE WHEN HE WAS THIRTY YEARS OLD

From a copyrighted photograph by Gessford, New York

swarthy, black-eyed man whose Oriental cast of feature seems more or less out of place amid the environment of Western civilization. He is Michael I. Pupin, head of the laboratory, and professor of electro-mechanics.

Such is his scholastic title, but the business world knows him as the shrewd and successful inventor of devices that have rescued sound transmission from irritating losses, and incidentally made him a rich man. His whole career is such an overwhelming vindication of the practicality of the scientist that it is well worth rehearsing here in brief.

Professor Pupin was born on a farm in southern Hungary. His people for many generations had been Serbs of the old order. At fifteen he ran away from home, stowed himself away in the steerage of a ship, and turned up at Castle Garden almost without a penny. He made his way southward to Delaware, worked on a farm there, and then came back to the great city, where he got a position in a factory.

The thirst for knowledge was strong in him, and he began to go to the night-school at Cooper Union. Mechanics had always fascinated him, so he specialized in mathematics. All day he toiled in a store; nearly all night he studied. By 1879 he had saved three hundred dollars, and with this he entered Columbia University.

So keen and so thrifty was he that by the time he finished his four years, he had saved three thousand dollars, made by tutoring at night and during the summer. His tuition had cost him nothing, because he had won scholarship after scholarship. With his savings he was able to study at Cambridge and at Berlin, and before many years he found himself in the faculty of his first alma mater.

You may imagine that a man who could push forward at this rate would not be content with the routine of a university professorship. His restless mind sought new fields of conquest.

ELIHU THOMSON, WHO MADE A FORTUNE OUT OF ELECTRIC WELDING, WHICH IS ONLY ONE OF HIS FIVE HUNDRED PATENTS

From a photograph by MacDonald, New York

He was naturally interested in the transmission of sound. From engineers he heard, day after day, that the crying necessity of long-distance telephony was some adequate medium for such communication. The old-time wires were all right when left in the air, but the moment they were placed under ground or water the electric energy was wasted and service was impaired.

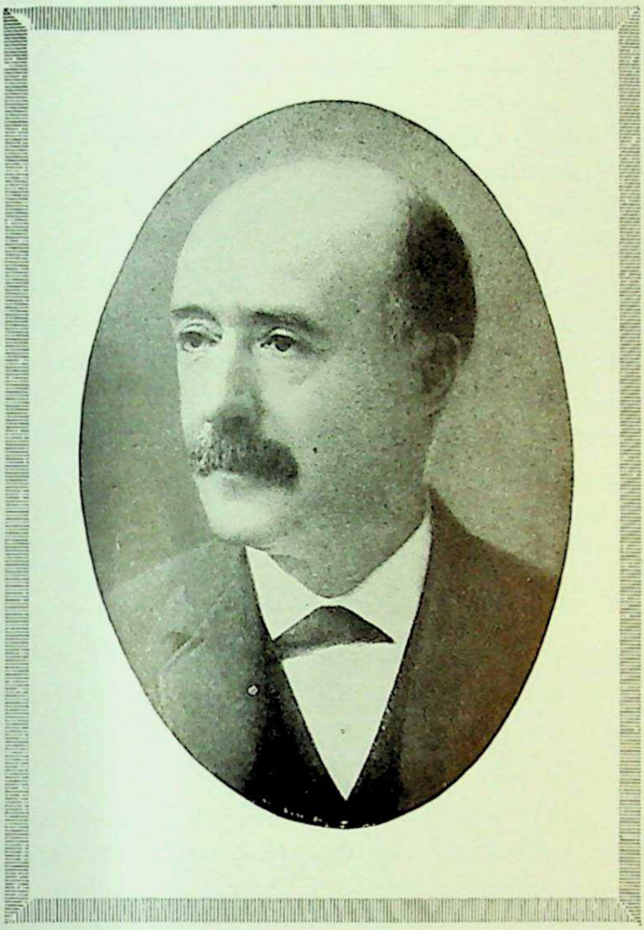
We had come into the underground era in all kinds of transportation. The time was ripe for an invention that would relieve one of the greatest agencies of modern civilization from congestion and impairment.

Professor Pupin went quietly to work, and perfected a telephone cable for underground and submarine use. The telephone officials were so hot on the trail of a device that would aid them that on the very day after he had secured his patent their agents were running him down.

One engineer, assigned to locate him, followed him from New York to his country home at South Norwalk, thence to Cambridge, Mass., and finally cornered him at Clark University, in Worcester, where he was spending the night with a friend. The result was that the professor, having proved his invention to be just what it was said to be, sold it out for a lump sum that made him immune from any further danger of financial distress. Today, when you talk by long-distance telephone from New York to Boston, you use Professor Pupin's cable.

Once started on the road to prosperity, Professor Pupin kept his pace. Half a dozen inventions—all sold outright—have each netted him large returns. His device for wireless tuning—which puts the different stations in perfect accord with each other—and his multiplex system of radio-telegraphy have both been sold to the Marconi interests.

Professor Pupin has demonstrated his practical ability in many ways. He is perhaps the most distinguished Serb in the United States, and his people over here look



ALEXANDER AGASSIZ, NATURALIST AND ENGINEER, WHO MADE A GREAT FORTUNE BY DEVELOPING AND FINANCING THE CALUMET AND HECLA COPPER MINE

From a photograph by Falk, New York

to him as a leader. Some years ago he found that the United Servian Benefit Societies, whose purpose is purely philanthropic, were in a bad way. They were more than sixty thousand dollars in debt; death claims by the score remained unpaid, and there was much hardship in consequence. Despite the fact that he was well-nigh absorbed in his scientific researches, he reorganized the societies on a business basis, introducing a new system of accounting and supervision. The result is that they are now on a stable footing, with a surplus of twenty-five thousand dollars, and a monthly magazine and a daily newspaper of their own.

Men of large affairs who have had negotiations with Professor Pupin all admit his unusual business sense; yet he has not exhibited it at the cost of his scientific ideals. He has a theory that a man of inventive genius must be practical.

"Why?" I asked him.

"Simply because the successful inventor is the mouthpiece of practical experience," he replied.

His long-distance telephone cable was an admirable illustration of this. Engineers had been experimenting for years to find such a thing, and Pupin knew that there was dire need of it. He simply capitalized the necessity.

This reference to Professor Pupin naturally brings us to Guglielmo Marconi, the wizard of the wireless. Marconi has not been unmindful of the commercial possibilities of his great invention, and he is now securely entrenched behind the great corporations that exploit the device.

It must be remembered that Marconi never felt the stern pinch of necessity. Had he mounted the tortuous path of the self-made, he might have had a still keener appreciation of the value of pound and dollar.

Marconi has a peculiarly strong grip on the favorite child of his inventive brain. The corporations formed to develop it had to have both his name and his cooperation, because every successive improvement—

which he was the man best qualified to make—rendered their investments all the more valuable.

THE MILLIONAIRE ENGINEER

What might be called the practicality of science is not confined entirely to pure research work. Take, for example, the case of a great mining engineer like John Hays Hammond, whose fortune long ago began to be computed in seven figures.

His training was scientific, pure and simple, but to this equipment he has always brought a strong sense of business and an ability to realize on opportunity. His marvellous "nose for ore" has led him to wondrous finds. Instead of being content with record-breaking salaries —he was perhaps the first engineer to receive as much as fifty thousand dollars a year—he always made himself a partner in big enterprises.

One of the things that first impressed Cecil Rhodes with Hammond was his fine sense of business. They were both men of tremendous vision, and the father of Rhodesia—Kipling's "dreamer devout"—saw in him a constructive ally, a fit comrade for the large task of empire-building. That eventful chapter in his life ended with the South African War, and his later activities have centered in America.

A FORTUNE IN FLYING

With the possible exception of wireless telegraphy, we have thus far dealt with inventions and enterprises that were comparatively of the established order. Now let us take aviation, the first thrills of which have scarcely subsided. Its lamented pioneer, Wilbur Wright —who not many years ago was earning a mechanic's wage by repairing bicycles—lived long enough to realize some of the fruits of his genius, for he left an estate of almost three hundred thousand dollars.

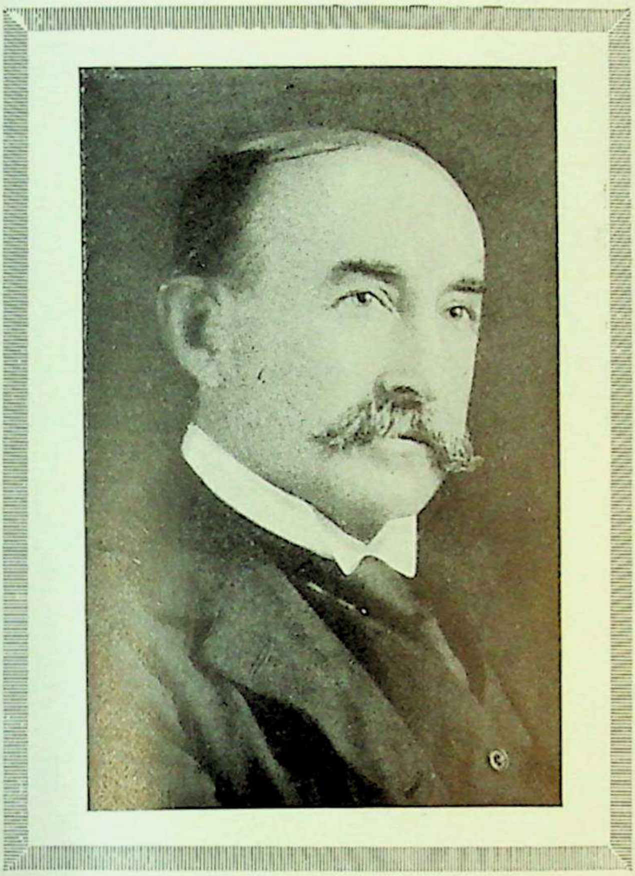
While this fortune is very modest, as compared with some of the rich stakes of invention, it is large when you consider the fact that aviation is not yet widely commercialized. The hazard of swift and terrible death is still about it.

But Wilbur Wright was a remarkable man in more ways than one. He got his first taste of business in a hard school, where every nickel looked big, and where every scrap of metal was capital. He believed in flying, and when his first machine lifted its wings from the earth it was protected by carefully devised patents. The Wrights fought every infringement that threatened to trespass upon their field.

When Wilbur Wright came back to his home country with the laurel of foreign approval upon his modest brow his own people began to rally around him. His first big company was financed by prominent Wall Street men. I once heard one of these capitalists say that he was amazed at the shrewdness, foresight, and downright commercial sense displayed by the seemingly ingenuous inventor from Dayton.

The result is that the Wright interests are securely organized. Indeed, Wilbur Wright's ability in this direction gave stability and character to the whole art of aviation in the United States.

Imposing as it is, this array comprises only the great beacon-lights of successful inventive and scientific genius. There are scores of other men, many of them almost unknown, but nearly all keen, hard-headed cap-



JOHN HAYS HAMMOND, A FAMOUS MINERALOGIST AND MINING ENGINEER WHO HAS CAPITALIZED HIS SKILL TO THE EXTENT OF MILLIONS

From a photograph by MacDonald, New York

tains of commerce, who have translated their ideas into gold. Among them are Francis Blake, whose transmitter gave the telephone its finishing touch of utility; Elihu Thompson, who gave the world electric welding; Charles F. Brush, who created the arc-light; and Charles A. Parsons, who developed the marine turbine.

In the end you find that genius, in addition to being an infinite capacity for taking pains, may likewise include an equally well-developed ability to make money.

OTTMAR MERGENTHALER

B. C. TILGHMAN

CYRUS HALL McCORMICK

SIR HENRY BESSEMER

CHARLES GOODYEAR

C. L. SHOLES

ROBERT FULTON

ELIAS HOWE

Who has not heard of the International Harvester Co.—the so-called harvester trust? or of the millions of Cyrus Hall McCormick, 2d?

Both the harvester trust and the millions are a direct legacy to the present Mr. McCormick. They were left him by his father, the late Cyrus Hall McCormick, inventor of the reaper and patentee of many other agricultural appliances.

The elder McCormick was one of the first millionaire inventors of the United States. He specialized in agricultural implements, his patented reaper alone revolutionizing agriculture and making possible the vast wheat farms of the middle West. The McCormick fortune was estimated at $50,000,000 at the time of the inventor's death.

Sir Henry Bessemer, English metallurgist and inventor, revolutionized the building trades of the world by the introduction of a process for the cheap manufacture of steel. The Bessemer process was first tried out in England, where the inventor had a hard time convincing capitalists of its practicability.

Robert Fulton was born at Little Britain, Pa., in 1765, of poor parents. His ambition in his early years was to become an artist. In this he succeeded, winning an international reputation by means of brush and easel.

While studying in England, however, mechanics engaged his attention and eventually he gave up art for invention, patenting an improved canal lock, a dredge, the first torpedo used in warfare, and finally perfecting the steam propelled boat for which he is famous.

Elias Howe, a mechanic who later invented the sewing machine, was born at Spencer, Mass., in 1819. $15.00 per week was good pay for Howe in his trade. After the worth of the sewing machine became recognized, however, he was in receipt of $4,000 per day in royalties, leaving an immense fortune when he died in 1867.

Technical defects in his patent papers cost Charles Goodyear one of the greatest of American fortunes. After years of experiments Goodyear patented a process for vulcanizing rubber, hitherto impracticable for commerce. His patents were loosely drawn by a patent attorney in 1844, and in the years that followed unscrupulous persons were able to successfully infringe upon his rights, reaping millions from his labors.

Ottmar Mergenthaler, born in Germany in 1854, was one of the most recent of inventors to reach the millionaire class through his inventive genius. Had he not been carried off by tuberculosis in 1899, when still a comparatively young man, he would have been a multi-millionaire.

Mergenthaler was the inventor of the linotype. He made it possible to set type by machinery, and in grateful recognition for his invention he was showered with wealth.

Christopher Latham Sholes was the man who first invented the "writing machine" or typewriter. He sold his rights later to the Remingtons for $12,000,000.

Sholes was born at Mooreburg, Pa., in 1819. He was a printer by trade, and during his early life patented a number of stamps and machines for numbering.

Out of these early endeavors grew his inspiration for the typewriter. His experiments were carried on in a deserted mill and carefully kept from the public until Sholes had secured iron-clad rights to his invention.

The millions of General Benjamin C. Tilghman were achieved through the discovery and patenting of a chemical process. Tilghman found that certain chemicals would reduce wood to pulp from which it was but another step to make paper. Within a decade he had reached the pinnacle of the ladder of financial success through his inventions.

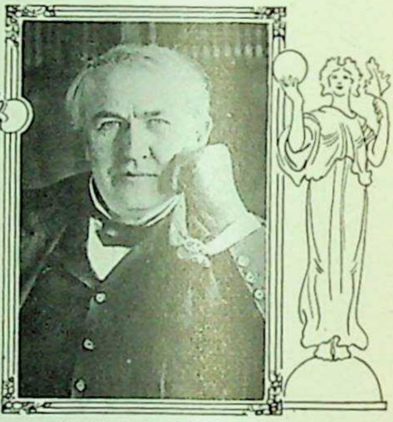
General Tilghman served with distinction in the civil war, the discovery of his process for the manufacture of wood pulp resulting from a shortage of paper following the rebellion. In 1866 he patented his invention and commenced the manufacture of paper, soon flooding the country with this commodity at rates far below those of other manufacturers.

ORVILLE WRIGHT

SIR HIRAM MAXIM

PROF SAMUEL F. B MORSE

BENJAMIN FRANKLIN



THOMAS EDISON

ALEXANDER GRAHAM BELL

ELI WHITNEY

JOHN ERICKSON

Alexander Graham Bell is famous as the inventor of the telephone. He was born in Edinburgh, Scotland, March 3, 1847, received his education at Edinburgh and London Universities, and immigratetd to Canada in 1870, later settling in Boston, Mass., where he began the train of experiments which led him to fame and fortune.

Bell at this time occupied the chair of vocal physiology in the Boston University. He was regarded as peculiar, and the telephone, which he showed to his fellow professors and offered for sale for a few paltry dollars, was regarded as an "interesting toy."

Benjamin Franklin, an inventor of note, has gone down to posterity famous rather as a diplomat and man of letters. Indeed his inventions, though important, were regarded by Franklin in the light of interesting experiments useful to humanity. They were rarely patented; in consequence others reaped fortunes through infringement upon his ideas.

Franklin has rightly been called the first of famous American inventors. He was born in Boston in 1706, the son of a poor soap boiler. Eventually he entered the printing and publishing business, retiring in 1878 with an income of from $15,000 to $20,000 per year, a comfortable fortune for those times.

The Franklin stove, in use today, was invented by him, another making a fortune from the idea, Franklin having refused to protect the invention with a patent. Extensive experiments in electricity were carried out by Franklin in addition to his inventions.

The fortunes of Eli Whitney, inventor of the cotton gin, should serve as an object lesson to all inventors inclined to be careless about taking out patents.

Whitney patented his invention in 1793 at the age of 28. He was so enthusiastic about his invention that he allowed its revolutionary character to become known, unscrupulous mechanicians were hired to break into the building where it was stored and copy the gin in toto. Later these infringers on his patents were able to pick countless holes in his patent papers and to deprive Whitney of the fruits of his invention.

The invention revolutionized the production and manufacture of cotton.

Samuel F. B. Morse, like Robert Fulton, was an artist of note before he took up invention. To posterity, however, he is remembered as the inventor of the telegraph, an instrument which has done more than any one invention of the past two centuries to promote civilization.

Morse was born at Charlestown, Mass., in 1791. In 1832 he became interested in electrical experiments and conceived the idea of transporting words by means of elecricity. Five years later the first test of his machine was made and its practicability proved.

Captain John Ericsson, who revolutionized naval warfare through the invention of the steel-clad monitor, was born in Sweden in 1803. So brilliant and protracted was his United States career as an inventor, however, that he has become known as one of America's foremost geniuses.

Ericsson devoted most of his attention to the perfection of steam engines, the invention of torpedoes and to naval architecture. During the civil war he brought to the Union cause the Monitor, which began a new era in battleship construction. Later he evolved and patented the first torpedo boat, calling it the destroyer. The modern propeller blade, fashioned like an electric fan, was also one of his inventions.

The success of Orville Wright as an inventor has been more spectacular than remunerative. The aeroplane, however, is but in its infancy, and Wright's basic patents are steadily winning him the monetary reward of originality.

Orville Wright was born in Dayton, Ohio, in 1871, and was educated in the public schools. With his brother Wilbur he took up experiments in flying where they had been left by Langley and other famous pioneers in the art of flying.

In 1903 extensive experiments were made at Kittyhawk, N. C. Here the Wrights demonstrated that flying in heavier than air machines was practicable, and in 1905 their first successful test was made. Since then the patented Wright biplane has become famous throughout the world and the patent rights of the inventors recognized.

Sir Hiram Stevens Maxim, the inventor of smokeless powder, is an American, despite his title. He was born in Sangerville, Me., in 1840, receiving only a common school education. His scientific knowledge he gained from extensive reading.

In 1881 Maxim went to England where he was knighted, a signal honor for an American. Maxim's fortune is estimated in the millions.

Here is the story of Thomas A. Edison's first invention. Edison was born at Milan, Ohio, in 1847. He started out in life "with some instruction from his mother" and when still a boy became fascinated with mechanics.

In his early twenties he invented an appliance for the telegraph. Edison took his patent to the president of a telegraph company on Broadway. The invention was so small and simple that Edison scarcely expected to realize money for the "toy."

THE CONGRESSIONAL LIBRARY

A Good Patent is the Key that Unlocks the Treasures of the World

Far more fertile than the gold mines of the earth have been the patents taken out by inventors during the past hundred years. Witness the meteoric rise to fame and fortune of Edison, Westinghouse, Elias Howe, Samuel Morse, Isaac Singer, Christopher L. Sholes, Ottmar Mergenthaler, General Benjamin C. Tilghman, and thousands of others!

Almost at random one may place his finger upon the name of a multi-millionaire of to-day and say for a certainty that his fortune had its inception with invention. Take Cyrus Hall McCormick, for instance.

Shortly before McCormick's death testimony was accepted by the Congress of the United States that the McCormick reaper was worth to the farmers of America $55,000,000 per year in labor saved! In passing it might not be amiss to say that the patent rights to the reaper were worth almost that amount per year in royalties to Mr. McCormick.

Another startling example of tremendous fortunes made through inventions is the sewing machine. Elias Howe, its inventor, was a poor mechanic. He was content to accept a salary of $15.00 per week and thought it a very good living indeed. Then along came the sewing machine, child of his brain protected by patent and his income rose from $15.00 to $42,000 per week, a matter of $1,460,000 per year!

Even the exotic imagination of the Eastern story-teller never surpassed this reality.

But Elias Howe was an inventive magician of the past century. He was born in 1819, reaped his vast reward and went down to death before the dawn of the new centennial. Let us return to modern inventors and an El Dorado still more wonderful.

In this category the name of Thomas A. Edison is a title to conjure with.

Edison was born in Milan, O. He received some "instruction from his mother." Apparently it was all sufficient, for before he had reached his majority he had won his spurs as an inventive genius. In middle life he was a millionaire, and today he employs 20,000 workmen, numbers his millions by the score and is known throughout the world as a scientist of the first magnitude.

Almost a twin to this remarkable success is that achieved by George Westinghouse. Starting with the air brake, the Westinghouse fortune progressed by leaps and bounds till today it is said to rival that of the Standard Oil magnate.

Ottmar Mergenthaler was another genius of the latter day who leaped from obscurity to immense wealth seemingly at a bound. Born in Germany in 1854, he migrated to this country and speedily became affiliated with the printing trades in those days when tedious type-setting by hand was the order of procedure.

It was weary labor, and Mergenthaler, guided by mechanical genius and inspiration, set about constructing a machine to perform the feat automatically. The linotype was the fruit of his labors, and he died a victim of white plague with his royalties heaping up about him in unspent hundreds of thousands. Had he lived he would have been a multi-millionaire.

Then there was the $12,000,000 paid Christopher Latham Sholes by the Remingtons for his rights to the typewriter. Sholes, weary of invention, accepted a lump sum rather than wait for more and still more millions through the accumulation of royalties.

Isaac Singer, whose sewing machines are now known wherever the good housewife presides, left behind him $33,000,000. At that he was a late comer in the sewing machine field, for Howe had preceded him by years with a finished machine capable of the same performance.

But Singer improved and wrought along new lines, borrowing $40.00 to protect his first patent until he had acquired rights to sewing machinery which made him a millionaire.

The manufacture of wood pulp brought millions to General Benjamin C. Tilghman. Before the Tilghman process was patented, cloth was used extensively in the manufacture of this commodity which, of course, was correspondingly high in price. Wood pulp paper, sold at a fraction of the linen paper prices, brought profits inestimable and bestowed the boon of cheap writing material on humanity.

Of the old school of inventors, Charles Goodyear and Eli Whitney, who, respectively, conceived the process of vulcanizing rubber and brought the cotton gin into being, formed two famous examples of labor misapplied through carelessness in protecting patents.

Goodyear's patents have been estimated as being worth a round million dollars, and Whitney's cotton gin, had it been properly protected, should have landed the inventor high in the multi-millionaire class.

But alas for eccentric genius! Through faulty patent papers, the thievery of the unscrupulous and the betrayal by friends both of these great men died in comparative penury and harried by lawsuits.

It is pleasant to turn to Samuel F. B. Morse, the inventor of telegraphy, as a contrast. Morse, the artist, dreamer, and mechanical wizard, carried his great invention to success and died enjoying the wealth and honor which should attend every great achievement.

Alexander Graham Bell is another inventor who has lived to see his invention ripen into golden fruit and to find himself feted, honored and beribboned by every country on the globe. It would be hard to even approximate his fortune, but Bell telephone wires now extend around the globe, and the royalties paid the inventor of the telephone have run long ere this into the many millions.

Even as this is written there is another mammoth fortune in the making; that of George B. Seldon, a little-known mechanical expert of Rochester, N. Y., who controls the basic rights to the gasoline engine. Even the present generation can remember when Seldon's patent rights would scarcely have been worth the paper they were written on—in the old days of the horse-drawn vehicle.

But behold, the automobile has swept the earth holding fadists in its grip, just as did the bicycle craze before and just as will the aeroplane mania succeed. Today there are manufactured in the United States alone, millions of automobiles, and the manufacturers of each of the engines by which they are propelled must pay Seldon! Surely his royalties must be enormous!

And now we draw to the close of this short adventure in a field of reality more strange in its sudden transformations than was ever the field of fiction. For where in the annals of constructive imagination is there the rival of this picture of sudden and vast wealth, this metamorphosis of the drudging slave of labor into a butterfly of finance!

Yet the category is incomplete, for there yet remain the fortunes of Orville Wright, Robert Hoe, the Maxim brothers, Hiram and Hudson, the patentees of piano players, processes of steel manufacture, modern firearms, and so on ad infinitum.

Patents are the paths to wealth.

TIMELY SUGGESTIONS

Valuable Expert Information
for Inventors and Others.
Published from Time to Time

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1913

THOSE turning their ingenuity to the making of inventions are constantly asking to be advised as to the direction in which they should employ their talents, and as to inventions for which there is a really existing need. Our advice generally is that every art is calling for further developing and each device for further improvement, and that each person should devote himself to that art or thing with which he has had experience and as to which he is enabled to fairly judge the need of improvement, taking into consideration also his natural abilities tending to fit him for the work he undertakes. But there is a constant demand from inventors and people generally for information about the things that are commonly recognized as engaging the activities of inventors, in which there is a well-recognized demand for improvements, and which offer considerable profit to the successful inventor. Responding to this demand we have investigated, and will continue to investigate, the various arts and devices that appear to be calling upon the inventor for development, and to present from time to time the result of our investigations, with a view to giving the inventor some idea of the condition of the art or things reported on; the reasons, if ascertainable by us, of failure in the art or devices heretofore; the nature of the improvement needed, and, so far as possible, point the way to the accomplishing of the needed improvement. By this means we believe we can be of real service to inventors generally, and by apprising them in a general way of what has been done in the various lines keep them from being misled into useless endeavors, as they often are when made without direction. Thus, in the following reports on some of the prominent lines of the inventors' work, we trust intelligent and helpful direction may be given.

It must not be taken that these reports comprehend all or even the most important of the problems awaiting the inventor, for every art and device is always calling to him to make it better, and as invention is generally spontaneous it does not ordinarily require directing to this or that field for activity. Still, there are many who have exercised their inventive faculty along lines that have not brought commercial success, and who seek to know what to invent that will be worth while should they invent it. We trust the following will in some measure meet this demand, and that only benefit will follow from the intelligent and painstaking review that we have sought to give to each matter presented.

We always invite correspondence for further information upon the various inventions.

1. **VACUUM CLEANER.**—Though seemingly an article of only recent invention the vacuum cleaner, like most important inventions, is a thing of growth and gradual development. Its universal use today is due to its perfecting. Many ways have been designed for producing the vacuum, and inventors are hunting for other ways that will make for economy, cheapness of construction and facility of operation. The broad idea is not covered by patent, and since the perfection of any detail is important inventors can be directed to this device for the exercise of their ingenuity and with every prospect of financial return.

2. **THE VEHICLE OPERATED GATE.**—There was a time when the many schemes devised for opening and closing the farm gate by the wheels of a wagon in approaching and leaving the gate were not in use. Today gates operated on this principle are very much used and are catalogued among farmers' supplies. It is important to the inventor that a demand be created, and this often comes slowly; but when it comes he should take advantage of it and rather employ his talents in an art that has been established and that affords him an opportunity to put into commercial use any improvement of merit, than to try to create something new in an untried field. There is a demand for improvements that will make more popular this kind of gate, and those already interested in the art commercially stand ready to deal for the improvements that make for popularity, cheapness, and reliability of operation.

3. **NUT LOCK.**—A word as to the nut lock. This is one of the most prolific fields for the inventor, resulting as it has in thousands of devices designed to prevent a nut from working loose upon its bolt. The effect of vibration in bringing about wear is generally lost sight of by the inventor, and what would seem efficient initially is generally not so in practice. Wear must be counted on, and wear of the bolted parts as well.

It would seem that the successful nut lock must provide for taking up wear from time to time.

The use of a spring is subject to action by the elements and is generally unreliable for outside structures.

4. **SHARPENING THE MOWING MACHINE.**—Every farmer knows how important it is to keep an edge on the cutter teeth of his mowing machine and how often he must whet up, in the field, each tooth with the ordinary hand stone. Self-sharpeners have been devised for various instruments—why not one for the mowing machine that while it works will also sharpen? The wear is greatest on the cutting bevel and very slight on the flat, under side of the tooth, and the sharpening must therefore be secured by a wearing down of the bevel. Some properly arranged friction element to contact with the bevel during a part of the blade's movement would seem to accomplish the desired end.

5. **PLOWING DEEP.**—Every one knows that it is advantageous to break up the soil to as great a depth as possible, but the objection to deep plowing is the turning up on top of the less fertile subsoil. Plows have been invented designed to open up the subsoil without turning it on top, but as yet no satisfactory plow is in general use that does the combined work of a turnover plow and a subsoiler without increasing the draft to an undesirable extent. The student farmer knows what effect he would like to produce in his plowing to deepen his soil's fertility and open up the subsoil, and his knowledge of what is needed with the application of ingenuity on his part will yet produce a plow that will make a larger yield.

6. **CHURNING.**— The rapidity in getting butter to come generally depends upon the temperature of the cream. Why do not inventors in this line turn their attention to the working of the butter fat? With the idea of ascertaining whether the churn was still in its primitive stage a dairy farmer was asked if the churn needed improving. His answer was this: "What is needed is some means that will work the milk out of the butter during the operation of churning or as a continuation of the churning operation. The different independent operations that must be gone through make the butter-making operation one requiring time and great care."

7. CULTIVATORS.—Improvements of the cultivator for growing crops have of late been of a distinguishing type, but these have arisen from the scarcity of labor and the need to ride the implement. Little variation seems to have been made in the character of plowing the cultivator does. In this the implement is limited, but it should not be so. From the man behind the cultivator should come some scheme of shovels that can be adjusted and combined quickly to do almost any kind of work the crops need. It is not uncommon to see the work of the cultivator gone over with a plow to properly dispose the soil about the plants to conserve the moisture.

8. BUILDING FIRES.—Will the time ever come when it will not be necessary to build up a wood fire in the kitchen stove to ignite the coal? The building of fires is still primitive, but it is fair to say that some provision will be made one of these days to the coal stove so that the coal can be ignited without a wood fire. A gas jet might be employed, but a system by which a small, hot flame is produced by air injection would seem to be preferable. The problem is interesting.

9. LATHES.— Every mechanic knows that he dare not attempt to turn his work down to final measurements on account of the lost motion present in the feed screw and the tool carriage which causes the tool to dig, and that he must finish his work down to final measurements with a file or other abrading instrument. The new as well as the old lathe is subject to this inaccuracy of working, and both can be provided with means to prevent the lost motion and allow the cutting to the final measurement in work requiring the greatest accuracy, but as yet there is nothing devised to meet this need. The value of such an invention, especially upon old lathes, should be considerable.

10. HANGING AWNINGS.—There have been some very decided steps taken in this art of late. The use of a number of screw eyes for attaching the awning to the top of the window frame has become rather obsolete on account of the inconvenience in hanging, the relocation of the screw eyes and the insecure and baggy support of the awning fabric. The head rod is now generally adopted, and various devices have been patented for hanging this head-rod awning. The protection by patent of the various hangers for head-rod awnings leaves a very desirable opening for the inventor with ingenuity to devise a simple form of hanger that can be manufactured for two or three cents and not infringe existing devices.

11. RAILWAY SIGNALLING.—From the constantly recurring accidents public opinion has been shaping itself so that a system of railway signalling and control must be inaugurated that will displace or work in conjunction with the present way-side automatic system. Inventors have been at this problem and many patents have resulted, but nothing has come into general use that is designed to give better signal indication or to automatically stop the train on surface roads upon encountering a danger condition. The reason has been because inventors have involved their systems with various devices that are a greater source of danger than the conditions they are designed to overcome. The inventor to be successful in this art must study existing engineering rules. There are three general types of systems—the mechanical trip, the third-rail, and those employing the track for the circuits, as in the system of closed circuits which constitutes the present block system.

12. KITCHEN CABINET.—This is one of the most useful adjuncts to the kitchen and has come into universal favor. Seemingly a mere matter of carpentry, this cabinet is the basis of many large industries that are vying with each other to improve the cabinet in its general features and in each detail. Every point is worth while. The inventor who would apply his ingenuity to this article should familiarize himself with the best makes upon the market and then devise his improvements. The fact that there is such an active business in kitchen cabinets makes a market for good patents on desirable improvements to the cabinet.

13. FIRELESS COOKER.—The general principle of this device is very old in use, but it has been due to the perfection of certain details of construction making for general serviceability and economy in the use of heat that it has come into such general use. In opening up this field of use the fireless cooker is creating abundant opportunities for the inventor who can substantially improve many of the details of construction. Among the faults of the cooker is deterioration in the packing material, resulting in several objectionable effects, particularly in giving off odors that contaminate the food. Simplicity of air-tight construction and added facility in handling are probably the lines to pursue for important improvements of the cooker.

14. A SOLDER FOR ALUMINUM.—Sheet aluminum is a wonderful product, but its use is very much hindered by the fact that it is not readily soldered. Special solders have been made for this work, but still great care and skill are required in their use. It is understood that producers of aluminum are looking for a better solder for this purpose and that a genuine opportunity exists for experimentation and discovery along this line.

15. ROOFING MATERIAL.—Notwithstanding that there are on the market a large number of roofing compositions, there is a need for inexpensive roofing material. Various asphalt roofings have been put upon the market that are cheaper than shingles, but with only about one-third of the life of good shingles. Metal sheathing does not ordinarily outlast the asphalt roofing. It would seem that some one would produce a roofing as durable as the clay tile without the weight and expensiveness of the tile and as readily applied as the asphaltum roll.

16.—PHOTOGRAPHS BURNT IN ON PORCELAIN.—There is no better way to make a photograph imperishable than to transfer it to a porcelain plaque and burn it in with the usual glaze, and to do this successfully has long been the goal of many working in this art. While the transfer of the photograph is readily made in various ways to the porcelain, the result of the burning is that the gelatin of the transfer cracks under the heat of burning so that the burnt-in picture is broken by many small cracks. The value of a burnt-in photograph with its fine indestructible glaze is important from its aesthetic quality, but when one comes to consider the need for preserving photographs for all time sealed within the burnt glaze its value is very apparent.

17. MAKING THE NECKTIE RUN EASY IN THE COLLAR.—Collars are on the market that are advertised to have an ample tie space so that the tie will slide back and forth without binding, but with the first laundering this tie space disappears and difficulty of adjusting the tie is present again. What is needed is some simple means that can be applied to a necktie where it is folded within the collar that will make the tie slide back and forth easily as it is pulled in the act of adjusting and tying. A device that will do this and at the same time be convenient to apply should be a successful prize to some ingenious person.

18. SHOE FASTENING.—Much has been done to devise some way to effect a fastening for shoes that will do away with the objectionable features of lacing and buttoning. The lace tips come off, and where lace hooks are employed they are found to wear the bottoms of garments; besides the lace is tedious and brings an almost hopeless despair when they break. Buttons are not subject to the adjustment that the lace provides. What is needed is some durable and permanent form of fastening device that is capable of change in adjustment quickly and is also readily fastened. The fact that these devices must cushion on the instep requires that provision be made for protecting the foot. A single adjusting strap arranged so that a pull thereon would close the shoe flap and tighten the same, the strap being secured by a simple form of buckle, might be in the right direction.

19. AUTOMATIC STOKER FOR LOCOMOTIVES.— Various automatic stokers have been invented, but the problem that is important is in properly distributing the coal. This means a great deal, for the distribution of coal in the fire box of an engine must be such a distribution that will not bank the fire and which will leave every particle of coal so that it can be readily converted into heat units. The railroad world is asking for a stoker that will do the work properly, and no better field for the exercise of invention is presented than this to the man who has the correct insight into the engineering conditions and the principles of fuel consumption. The knowledge of this demand comes from the best railroad-supply interests.

20. EROSION OF GUNS.—It is gathered on reliable authority that the life of the guns on our battleships is about one hundred shots. When these are had the gun is but a half of a gun, and the long and expensive operation of supplying a new rifled lining or tube has to be undertaken before the gun is fit for battle. The policy of the United States Navy in testing the efficiency of its gunners' training by target practice every year is rapidly consuming the life of the guns. One impossible plan, seriously considered for adoption by the Navy Department, was to employ a slightly larger shell for the worn-out gun. This is impracticable on account of the unnecessary cargo of shells and the difficulty that might arise from confusion by departing from a standard. The erosion takes place from the hot cutting gases of the explosion. The remedy is in some sort of steel resistant of these gases or some means for completely absorbing the gases without impairing the velocity of the gun fire. This is a problem for the chemist and metallurgist.

21. **PNEUMATIC TIRES.**—Thousands of dollars have been spent, not only by the casual inventor but by the manufacturer, to provide some means for preventing the wearing and puncturing of tires. Innumerable schemes have been tried to incorporate within the rubber tire metallic sheets of different form and arrangement to provide an armor, and various means have been devised for externally armoring the tire. The internal armor is objectionable from the wear that ensues, and does more harm than good. The external armor is subject to the same objection when made a part of the tire. The attachable wearing shoe suitably armored has some advantages, but it interferes with the resiliency of the tire. The value of the pneumatic tire is that the vehicle is riding on a cushion of air and that the inequalities of the road are so received by the rubber of the tire and this air cushion that they are practically eliminated, so when it comes to armoring the tire these fine qualities must not be lost sight of. Keep them present and provide against the puncture without lessening the life of the tire and the problem is solved. It is not an easy problem that here confronts the inventor, but it is one that is worth the solution.

22. **AUTOMOBILE TRUCK TIRES.**—The success of the motor truck has brought along with it the problem of a perfect or satisfactory solid rubber tire. The cost of these solid tires

is considerable, and any improvement as to form or reinforcing that will prevent wear and tear if really meritorious will find a demand. Inventors and manufacturers are turning their attention to the problem of better-wearing tires for trucks and such as may be readily applied. The truck can not be put out of commission without seriously interfering with the business depending upon it, and hence the value of those improvements that will admit of unskilled workmen in making repairs and replacing tires.

23. MOTOR TRUCKS.—On account of the need for great load-carrying capacity the motor truck is not so well adapted for the pivoting of its front wheels at the ends of the axle as by the knuckle joint, and for this reason it is desirable to have the forward truck turn upon a fifth wheel as in the ordinary wagon, this structure being well balanced and strong, but because it is desirable to have the engine mounted forward the pivoting truck is not in favor. The front wheel should be the tractors for a truck, as a pull is obtained instead of the push given when the back wheels are the tractors. Here then is a problem involving the employment of the pivoted truck, pulling tractor wheels, and steering and control thereof from the truck frame.

24. AUTOMOBILE ENGINE SUPPORT.—The pneumatic tire is mainly responsible for the invention of the automobile, because without the smooth-running and shock-absorbing wheels any engine would soon rack to pieces. Even with the pneumatic wheels there is still much twisting and jarring that comes upon the engine and its line of shafting, so that much attention has been given to the manner in which the engine and its driving shafts and transmission are mounted in order to defeat torsion and other disalining effects that are injurious to the bearings. The three-point suspension has been employed and this gives a third point pivoted on a support from the chassis, and this pivoted point of suspension is in line with the drive shaft. These improvements have been productive of good results in the line intended, as they relieve the engine and transmission and shafts from the torsion to a great extent, but the inventor who studies this matter of engine mounting will doubtless find much to add to what has been done and with greatly improved results and longer life to the automobile.

25. A SIGNAL THAT IT IS RAINING.—One sleeping with the window open will sometimes awake to find that rain is coming in upon the carpet, and there are various situations which make it desirable to give a warning that the rain has begun or is coming into a room. It is not impossible to devise a simple device that, set in the window, will cause a bell to ring by the falling of the first few drops of rain thereon.

26. BILLIARD CUE TIP.—The cue is provided with a leather tip, and in order to keep it from becoming slippery is rubbed over every now and then with chalk. This chalking the cue makes the game a dusty one, and is a serious drawback to the playing of billiards as well as a general nuisance. To provide a different character of tip or to substitute something else for the chalk has been the aim of inventors, but still the chalk and the old tip is being used generally. The question is: What will take the place of the present tip and not wear slippery, or what treatment can be given with the same effect of the chalk without its dust?

27. REMOVING BARBED WIRE BEFORE FORTIFICATIONS.—Recent warfare has employed barbed wire with great success as a means of retarding the advance of the enemy and for demoralizing the soldiers generally. Every soldier should be supplied with an instrument by which he can quickly cut this barbed wire and remove it as a menace. Some means mounted on the gun and employing the leverage of the gun would always be in readiness and not cumbersome.

28. PROTECTING TORPEDOES FROM DESTRUCTIVE FIRE.—Both torpedoes and torpedo boats are in need of being screened from view from the attacked battleship, and it is proposed to cover the advance in a cloud as by throwing small projectiles containing a cloud-producing compound. It is thought that steam power will have to be resorted to for projecting the projectiles. By a similar process a cartridge can be used to create a haze sufficient to hide a battery, so that the sharpshooter will have no chance to pick off the men.

28. TAIL CONSTRUCTION FOR AEROPLANE.—The raising of the tail of the aeroplane from a sudden and violent upward gust of air has been responsible for many of the aeroplane accidents. Construction that will automatically operate to release the hold of the sudden gust should be worthy of the attention of those in this line of invention.

30. AEROPLANE FABRIC.—A fabric is desired that is so prepared as to diminish friction of the air thereon. The air pressure is very great, and this friction becomes a matter of considerable importance.

31. INCREASING THE SOUND OF THE PHONOGRAPH.—There is no doubt but that the phonograph can be made to give off sound many times louder than is now done by some means that will magnify the vibrations. It has been suggested that a thin sheet of steel ribbon in motion between the disc and the magnetic core can be so employed as to finally accomplish this end. The intensity of the telephone was increased and made practical for long distances by varying the resistance.

The student of this art would also do well to devise a means of screening the scratching noise of the needle from the softer tones of the voice. A sound screen that would absorb these harsh tones without harmful effect on the voice tones would seem to be needed.

32. TRAINING GUN POINTERS.—At present the chief method of training Uncle Sam's gun pointers is practiced in a closed room by means of a tube mounted on the gun sighted at an object near at hand made to represent a ship and to move so as to give the relative movement between two ships at sea. The target practice with the big guns at sea is principally for testing the efficiency of the training. It is pointed out that training of gun pointers should be had at sea under all conditions of battle, and a plan has been invented for sighting these guns and checking up the aiming without the need of actually firing them, but this is a new art and has not been adopted. It offers, however, an excellent field for inventors.

33. CAR COUPLERS.—The Master Car Builders Association has a committee appointed to consider the car coupler and its improvement. This committee has been in existence five years, and is continued from year to year. The committee have been making a great many tests at Altoona, Pa., for the purpose of finding a coupler that will meet modern conditions of railway operations. Vertically-sliding gravity-actuated locks seem to be favored. The wedge-shaped lock for the knuckle has been strongly urged by some as a most desirable form, as it automatically compensates for wear of the parts and holds the knuckle rigid.

It is also proposed to permit considerable slack between the outer face of the knuckle and the opposed buffing face of the coupler head in order to facilitate the passage of the cars over vertical curves or humps in the track such as are present when the cars are passing from an up to a down grade, and at bad spots in the yards.

The Janey type of coupler has a straight buffing face, making a slight angle with the longitudinal axis of the coupler. It has been suggested to make this face at right angles to the longitudinal axis of the coupler so that the blow of the couplers in coming together will be more direct.

These observations will point the way to the needs in this art.

34. LOAD CONTROLLED BRAKE MECHANISM FOR RAILWAY CARS.— It has been the practice to make the brake pressure on the car wheels a certain percentage of the weight of the unloaded car. This works very well for the unloaded car, but when it is loaded this pressure is not sufficient. If the pressure is made to meet the loaded condition then the wheels of the car when the car is empty jam and cause sliding of the wheels and the wearing of the same flat as the result, while wooden cars are damaged when between heavy steel cars. Various schemes have been devised to automatically control the brake pressure to meet the loaded and unloaded condition of the cars. The leverage system is one of the methods employed, but it can be said that so far there is no system that is entirely satisfactory and that this subject is a very live one among the railroads.

35. CAR TRUCKS.—One of the most important trends in this art is to make the car truck flexible, so that the wheels will yield readily to any unevenness of the track as well as to the curves of same. The truck frame must preserve its rectangular form and be rigid in itself and the car axles must be in parallelism in the truck, but there must be provision by which the wheels can readily respond to a slight change in all directions independent of each other.

36. FRICTION DRAFT GEAR FOR RAILROAD CARS.—The last word has not been said in this art by any means. The spring type of draft gear answered somewhat with wooden cars, but with the advent of the unyielding and much heavier steel car absolute demand has been made for a draft gear of the friction type. The principle is admitted to be right, and eventually a device of this character will be devised that will take up the blow of cars as they come together that will distribute it properly and without injury or great shock.

37. A SELF-EXTINGUISHING LAMP.—All lamps go out when the oil is consumed, but if there is oil in the lamp there is always the necessity of blowing out the flame. Many situations arise where to do this is inconvenient, especially on cold nights when one has retired. It will be a decided improvement to the oil lamp if some simple means were devised so that the lamp could be set or adjusted to extinguish itself in five or ten minutes after adjustment. Then one might retire to bed leaving a bright light burning which will cease to burn when one is snugly disposed. Some people can not get to sleep readily without a light burning, and must arouse themselves later to extinguish it.

38. PROTECTING ORCHARDS AND CROPS FROM FROST.—Orchards are generally protected from frosts by the building of fires in and about the same. Lighted oil pots, coal baskets and the like, spread over the area to be protected, have been employed. These devices would be productive of much greater benefit if they were set to burning before the frost sets in, but the difficulty of getting a large number of these fires started in time has almost rendered this plan impracticable. The problem is to devise a means for quickly igniting the fuel and upon the first indication of frost, and some effort is being made to devise automatic igniters that will operate upon a predetermined fall in temperature. The principle of the thermostat finds a new use in this art.

39. LINING WELLS.—Concrete made up in convenient form for supplying a cheap lining is an improved and economical well construction. The lining must be formed in sections and applied in some cases as the well is dug to hold back the earth walls. There is a substantial art built upon this general line of employing concrete, and it is claimed that it is better than the more expensive pipe tiles.

The field for the inventor is not alone in the form of the concrete sections, but extends as well to the moulds for same. There would seem to be plenty of opportunity for a simple and convenient form of mould that would commend itself to the use of farmers, so that they could mould cylindrical concrete sections with very little labor. Nothing is so important to the farm as keeping the well water pure.

40. METALLIC CAPS FOR BOTTLES AND JARS.—In the packing and preserving industries no step has been so important as the metallic cap upon the glass container. The advantage of the metallic cap is not due alone to its efficiency of hermetically sealing by means of a lining or gasket, but in the cheapness of its manufacture, so the important consideration for the inventor in this art is that of cheapness to be accomplished through the employment of very thin sheet metal. When it comes to the giving of orders, frequently involving a million caps, the thinness of the sheet metal of which they are formed is the deciding factor for the determination of price. Therefore, the inventors of this art have been vying with each other to outdo the other in the use of thin metal, relying for strength and stiffness upon the manner in which the cap is formed. In forming the cap much attention is paid to the retaining means of the cap, which must also be of the required strength and be readily and cheaply formed in the making of the cap. Any improvement in this art that would save a tenth of a cent per gross, without lessening the efficiency of the cap and its ease of application, would be considered a material advance.

41. THE FOLDING UMBRELLA.—Notwithstanding that for many years inventors have been striving to produce folding umbrellas that can be brought into small compass and notwithstanding the granting of many patents for umbrellas of this character, yet the every-day experience of all shows that this type of umbrella has not come into general use, and this means that the efforts so far made have not produced a successful umbrella, one at least that would to any extent supplant the old type of umbrella. Various intricate plans of folding of frame and cloth have characterized this art, but it would seem that the mechanical problem involved should be obtained much more simply, and it is predicted that one of these days a folding umbrella will be in common use, and the remark will be, as it often is, "How very simple."

42. METALLIC RAILWAY TIES.—The railroads of the country have long recognized the need of a substitute for wooden ties, recognizing as they do the increasing scarcity of the wood product as well as its increasing cost. Many patents have been taken out for steel ties of various forms of construction and for ties constructed of reinforced concrete. A great deal of serious attention has been paid by railroads to these substitutes for wooden ties, and while it seems that they are efficient in so far as durability goes, they produce an unyielding roadbed and make travel unpleasant. The shock-absorbing quality of the wooden ties has been found to be the most important feature of their use. The substitute is still to come, but the successful inventor will not leave out of his consideration the yielding and shock-absorbing quality that is present in the wooden tie. He will do well to retain the steel structure or the reinforced concrete structure, provided he fasten the rails down on a bed of wood or a bed equally efficient as wood, that he may retain the virtues of the wood ties.

43. CANDY WRAPPING.—The increasing use of parafined paper for wrapping candies, particularly the soft kind, has made a legitimate demand for improvements in candy-wrapping machines. The production of a simple machine of very low cost that would not only pull the candy into a small roll and cut the same, but wrap each piece as it comes from the cutter, would find a market in the establishment of the small candy maker. Many ingenious ways of handling and feeding a strip of parafined paper from off a roll so as to receive the candy for wrapping and close about it would become apparent to the mechanical mind that sets itself to devise this performance mechanically.

44. PUNCTURE PROOF TIRE.—The idea has been suggested to employ in connection with the fabric of the rubber tire a tube formed of rings of steel, after the manner of bullet-proof armor. This metal fabric is thought to possess such yielding properties in all directions that when properly combined with the tire it will respond to every yielding of the same. The difficulty present in the use of such a metal fabric is in finding the proper means to cement or attach the rubber to the rings of this fabric so that it will always remain intact. Much has been done by way of incorporating metal fabrics in the body of rubber tires, but the common fault has been that the rigidity of these fabrics set up a great amount of wear that ultimately destroys the efficiency of the tire.

45. REMEDYING A CAUSE OF EXPLOSION IN AUTOMOBILE TIRES.—It will be noticed that that portion of the arc of automobile tires which rests on the ground is flattened into a straight line which forms a cord of the arc and is therefore shorter than the arc, in consequence of which when an automobile is moving this flattening and contracting of the tire is traveling around the same, but inside of the tire there is a violent current of air traveling opposite to the motion of the wheel. Furthermore, in consequence of inertia and the resistance of the fabric this moving, flattened or choked portion of the wheel tends to lag, not being able to travel as fast as the extreme circumference of the wheel, particularly at high speed, and thus we have the situation of the bulge of the tire, just forward of the flattened portion, getting now and then under the wheel and causing the automobile to jump again and again. Thus a racing automobile advances somewhat by bounds and leaps. The theory is put forth that sometimes under the pressure of inside air which is traveling in an opposite direction to the wheel rotation, and the momentum of the jumping automobile and the striking of the ground, produces an explosion generally accompanied by fatal results. The problem is to destroy the formation of this bulge or to move it higher up along the circumference of the wheel, so that it can never get under the wheel and explode.

46. DRAFT EQUALIZERS.—It would seem that inventors had nearly exhausted this art, but a great number of patents on draft equalizers have been granted in the last few years which indicate an activity in the art, and that notwithstanding the many devices devised to equalize the draft of horses that there is still room for improvements. Some of the devices are rather intricate, while others are simple. It is clear from a study of the patented art that there is very little in the mere problem of equalizing the draft. The important thing is to so dispose the elements of the draft appliances as not to interfere with the turning of the team, and the arrangement should be such as to hitch the horses close to the load. The draft equalizer should operate to prevent jerky motions being resisted by the horses at their collars. Above all, these devices should be such that they may be readily disassembled and used with fewer horses, as farmers generally make a wide use of their implements and this device must have wide adaptability.

47. DRAFT APPLIANCES TO APPORTION THE DRAFT UNEQUALLY.—Instead of equalizing draft it is very often necessary to so proportion the draft between horses of unequal pulling power as to make it impossible for the smaller and sometimes the more willing horse to do much pulling. The common resort of the farmer is to check back the too-willing horse, but, as every farmer knows, this is generally a make-shift. There should be some arrangement of the elements of the hitching appliances so that a proper adjustment can be made to apportion the draft to suit the animals.

48. SUBSTITUTES FOR RUBBER.—Quite an art has been built up of rubber substitutes that have relieved to a large extent much of the overburdened demand for rubber. Need, as is always the case, brings about the discovery required to relieve it. A German inventor dissolves amber, colophonum, and castor oil, subjects this solution to the action of sulphur while the solution is at a high temperature, passes ozone through the mass, and finally treats it with chloride of sulphur in the presence of a solvent and calcium carbonate.

A plant was found in Colorado containing a gummy portion, and the product was patented by B. F. Spencer in 1906 as a rubber substitute.

Gelatin has formed the base of some of these substitutes, and common Irish glue has been used. One formula is glue, molasses, glycerine and wood tar.

The field is essentially an experimentive one, and practical results therein are worth while.

49. ARTIFICIAL IVORY AND HARD RUBBER.—The scarcity and the cost of ivory is responsible for the well-developed art of ivory substitutes. As with rubber substitutes peculiar and widely differing elements have been compounded with fair results to produce artificial ivory, and, like the substitute-rubber art, there is opened here a wide field to the inventor for experimentation. Shellac combined with bone-dust, ivory-dust and the like has been employed with good results.

50. OYSTER OPENERS.— Various machines and devices have been invented and patented for opening the oysters, from a simple knife blade combined with pinchers to a rotating machine and other types for breaking the shell. The method of hand-opening with oyster knife and its general use indicates the lack of success in these many inventions, though the need is apparent for some improvement to be made over the shucking with the knife. The operation is necessarily one requiring the keeping clean of the shucked oyster; otherwise the task of separating it from its shell would not be so difficult for machinery. When it comes to invention no one dares to say that the seemingly impossible result can not be accomplished, and oyster packers look forward to the time when the work of shucking will be greatly facilitated.

51. GAS IRONS.— The coming into very general use of the gas iron having the gas burner within the iron has opened the way for some improvements for these devices. The burners of these irons are very crude, making the combustion very imperfect and the giving off of monoxide gas, a matter of serious complaint, as the user of the iron is always close to the same and the breathing of the poisonous gas follows with sometimes very disastrous result. The remedy of course lies in perfect combustion of the gas, and this must be accomplished by some simple scheme of ventilation.

52. WELL-DRILLING RIG.— The apparatus that is in use today for drilling wells is the same that has been in use for many years without substantial improvement. It consists of the cable-carried drill tool and a walking beam for giving the rise and drop to the tool, which walking beam is controlled by a pitman operated by a band wheel. Everyone is familiar with this walking-beam structure. It is very primitive, and has been open to many objections. Some improvements have been introduced in order to make the cable-operating end move downward so quickly as not to retard the falling speed of the tool, and to raise more slowly and to get this result without interfering with an even speed of rotation of the band wheel or carrying jar or strain to the engine. It has long been a comment in this art that the walking-beam principle has not been discarded long ago. Improvements in well-drilling rigs doubtless only depend upon someone taking the initiative who fully appreciates the work desired of the drilling tool and the manner of feeding it constantly to greater depth during the drilling operation.

53. IMPROVEMENTS IN TYPEWRITERS.—All the well-known makes of typewriters employ a hard rubber platen, which generally constitutes the paper roll, and this platen resists the impact of the type upon the paper. By this arrangement the making of many duplicates is limited and the employment of thin paper is made necessary for the duplicate copies. Considerable thought has been given to the question: How can the efficiency of the typewriter be increased in the making of duplicate copies and in producing a clearer type impression? It has been suggested that instead of the roll or platen that some suitable form of paper feed could be employed, and that corresponding to each type there would be simultaneously operated a type striking from the rear, so that the blow of the type would be confined to its actual surface and not distributed as it now is to such an extent to the paper and the platen outside of the type surface. Any improvement that will make for sharpness in the type impression will not only produce neater work, but will make possible a greater number of copies and the use of a heavier paper for the copies.

54. STORAGE BATTERIES FOR SUBMARINES.—A student of naval matters of considerable authority considers that the submarine, to make it really effective, must have provision for a very high rate of speed, if only for half an hour, in order to allow it to meet the emergencies of battle. The submarine launched from a battleship must be able to proceed quickly to an advantageous position on the enemy's line for battle, and to launch its torpedoes from an unfailing hitting position. To get the speed necessary for a short period some form of storage battery is proposed that will deliver all its watts in say a half an hour and but once during its life, the recharge being not necessarily required. It is even proposed to destroy the battery by its violent discharge of energy. It is noted that five tons of weight is carried by each submarine merely for submerging purposes, which weight can be detached from the submarine to lighten it in case of emergency. These five tons can consist of such an auxiliary ephemeral battery. Everything, however, depends upon the material used for the storage of electricity.

55. PERFECT COMBUSTION.—At the time when the addition of fresh coal is necesary the burning of the coal in the furnace proceeds at the highest temperature and the oxygen of the incoming air or draft is totally used and very little if anything is left of it for the developed gas, especially the gas following the addition of fresh coal, and we therefore have the unconsumed products of combustion passing away in the form of gas and smoke. The patented art shows many efforts to introduce air into the furnace at such points as to meet and combine with the developed gases and cause their burning within the furnace. The air for this purpose has also been heated to increase its efficiency. This general principle is accepted as correct, but the means for carrying it into effect while various have not attained the perfect result desired. The ordinary draft of a furnace does not appear to be capable of inducing sufficient air to completely burn the fuel and its gases, and the forced draft seems to be absolutely necessary, and this forced draft, it would seem, should be employed not only to deliver the air under the grate but should by separate channel deliver air above the grate to be heated, and when heated delivered to the developed gases at a point where ignition may take place.

56. TEMPORARY BINDER FOR SET UP TYPE.—It is only necessary to visit any printing office to see what a primitive and time-consuming method is employed to preserve the set-up type when it is taken from the chase after printing. The pages of type to be retained in the page form are bound with ordinary twine and laid away on a shelf until further used. For a long time printers have recognized the need of some simple and cheap form of a binding frame or means by which these pages of set-up type can be held together, and nearly every printer has thought about devising something to meet the need while many have produced devices which have not proven entirely satisfactory. It would seem that in view of the different sizes of the pages of type that some means must be employed having a wide range of adjustability. As many of these temporary binders would be needed, they must be very inexpensive.

57. APPLIANCES FOR CLEANING PIPES.—In order to have flexibility and other recognized advantages a shaft is formed after the manner of a coiled spring and composed of two such shafts one within the other, the coil or twist of each being contrary to the other. The purpose is that when one shaft is being subjected to a turning or twisting motion in one direction the other shaft will tend to untwist itself. At one end of such an instrument a screw is affixed, while at the other a head is arranged for turning the instrument. A recent patented improvement consists in the addition of a nut through which the shaft passes screw-wise; thus, by turning the shaft in the nut the shaft will advance or recede according to the direction of twisting. When the shaft is introduced in a pipe the nut is kept close to the opening of the pipe; then by turning the handle the screw-head will advance and will entangle itself in the clogging material, but when we begin to turn the shaft in the opposite direction the resistance of the clogging matter retains the screw, and in consequence of that a part of the shaft within the pipe becomes extended and the twisting deformed and incapable of proper action within the nut, practically spoiling the instrument. The problem is to prevent this occurrence by some arrangement or improvement. The foregoing relates to the cleaning of plumbing pipes particularly, but in cases of tubular steam boilers the operation meets with other difficulties. In order that the coils of the shaft will readily pass through the screw nut and have screw action therein, the wire of the coils of the outside shaft is of triangular cross section, but this permits the shaft to advance too quickly, so much so that the cutter at the head of the shaft is unable to work its way forward by cutting off the incrustations within the pipe and in consequence of which the shaft is stopped. Here another problem presents itself, namely, How with the increase of resistance shall the advance of the shaft and cutter be checked? and, How shall the above advance be made dependent on the resistance that is met with by the cutter?

58. TO DETERMINE THE APPROACH OF AIRSHIPS.—In military circles it is regarded of considerable importance to discover at the earliest possible moment the approach of an airship, which has come to be a very important factor in war. Small captive balloons, carrying acoustic apparatus, will doubtless be employed to discover the approach of dangerous Zepplins, through the air vibrations caused by the propellers of the airship. The acoustic apparatus should be so devised as to give electrical signal to the station below on the earth. A chain of such captive balloons, disposed at one mile distance one from the other, may protect a city or military camp from the night attack of dirigibles, because as soon as the signal is given aeroplanes, provided with search-lights, could quickly discover the Zepplin and bring it down. The air waves produced by propellers have different frequencies from those of naturally existing air waves, therefore the discovery of the former must be possible with the aid of very sensitive apparatus.

59. PROTECTING AGAINST DROPPED BOMBS.—The great apprehension against a night attack could be relieved in great measure if some means were found to make dropped bombs explode a few yards above the deck of a battleship as the effect would be nil. Nets have been used in some navies for the protection of ships from torpedoes, and light nets could doubtless be stretched sufficiently high above a battleship's deck to explode bombs in mid-air. The nets could carry an electrical current of sufficient strength and proper character to make more certain an explosion upon contact with the net. The problem is to find the convenient arrangement for the stretching of the net, also the proper character and the strength of the electrical current.

60. EXPLODING TORPEDOES.—The certain and deadly effect expected and desired of torpedoes exploding by contact with a vessel has never been realized, and now, with the improvements in the construction of battleship hulls, the effect of such an explosion is materially reduced. The battleship is only in certain peril when a torpedo explodes under it, the danger being certain destruction even at a depth of thirty feet. The point for inventors to consider is how to cause the torpedo, on approaching the ship, to make a deep dip under it and explode there.

61. CLEANING GAS PIPES.— Gas pipes become obstructed by the deposit of crystals of naphtaline. A flexible shaft can be introduced into any pipe, but the shaft should have such construction that it would be capable of collecting and picking up the small crystals so that they may be readily withdrawn from the pipe.

62. TO INCREASE LIGHT INTENSITY.— The problem of increasing intensity of the electric arc light has brought about the suggestion of introducing into the electric arc two streams of gas, which, by their combustion, produce light. The electrical current would enormously raise their temperature at the point of combining, and their lighting power will be increased accordingly. The introduction of the gases can be through an axial boring of the carbons.

63. A PLANT TO PRESERVE THE CLOVER STAND.— Clover can be planted in the same soil only once in seven years, and in rare cases once in four years. If planted in the same soil for two consecutive years, the crop of the second year is invariably destroyed by a kind of fungi; yet there are instances where clover planted close by certain meadows prosper year after year. What is the reason for this? It is thought there must grow on the meadows some plant that protects clover from fungi. If it were possible to plant clover every year on the same soil then the gain to the world would be enormous, as clover is a soil builder and is one of the best hay crops. What, then, is the plant to be associated with clover that will protect it from the fungi and allow it to reseed itself?

64. ENRICHING THE SOIL.—It is a well-known fact that the subjection of the soil to a temperature about that of the boiling point very considerably enriches it. The same effect is obtained through the exposure of soil in a fine state of division to the action of a glowing sun, the heat and the light rays of which produce the same result as the raising of its temperature, namely, they destroy the microbes that live upon and destroy the useful microbes that produce saltpetre. A similar effect is produced by the action of electricity, but, while this action is well established, the manner in which electricity acts is not understood. It may be that the manner of its action is the same as that of heat and light. It is suggested that if two metallic wheels, serving as electrodes, were run in proximity one to the other on a wet soil, and the electric current was allowed to circulate between them, it is possible that the effect might be the enriching of the soil. The application of such a method would be comparatively easy and would adapt the electrical treatment to large areas. We can expect to see some pronounced success made in this direction as a result of experimentation.

65. STOPPING SLIDING ON THE CULEBRA CUT.— It is the established opinion that the iand slides at Culebra, on the Panama Canal are sure to occur from time to time unless someone comes forward with a suggestion of means that will be effective in holding the slopes of the mountain in check. Nature has her own way of holding up slopes that are as steep and of greater extent than Culebra, and it would seem we will have to study and copy nature to prevent sliding at Culebra. Perhaps immense reinforced concrete pins, formed in deep tunnels in the slope, will serve in the absence of retaining rocks. Whatever it may be, however, the suggestion to the Isthmian Canal Commission might be worth millions to the Canal and be a profit to the inventor.

66. THE CURE OF TUBERCULOSIS.— It would be of manifest interest to any art to bring into the working field the greatest number of workers and to wrench from the ordained priests of science, working in a few richly endowed laboratories, the enviable privilege of getting hold of Nature's secrets. Take the case of the White Plague. Cows are as much subject to it as men, but why should cows be ruthlessly killed and not be subjected to experiments for a cure? Sanitoriums should be established for the cow, where veterinarians could test their own ideas and also the general suggestions coming from the general public, thus passing the problem more to the inventors experimenting on cows. The chances of the successful solution of the problem will be greatly increased. There need be no apprehension that the inventor would not answer the call, the incentives being the blessings of humanity, the glory, and finally, one million dollars. We note here a suggestion coming from the profane side. It is known that the she-goat is not immune from tuberculosis, but that the male is absolutely immune and it is thought that the immunity of the male may be due to a state of strong chronic uremiae, the urine being so densely saturated with uiates that the grass it falls upon is totally burnt out, while the flesh of the male is uneatable by reason of its obnoxious smell and its hardness. The cause of immunity may lie in the fact that its tissue, by reason of being hardened under the action of urates, provides cells that are unfit for the culture of the bacillus. If this were true, the fact may have great value. It may not be desirable to produce uremiae in man, because of general bad effects, but it may be that under the influence of chronic uremiae there may be the secretion of some substance carried in the serum which substance may act as an antitoxine. Again the protective principle of the male goat may be the product of the general metabolism, and in such a case, it would be contained in the urine, the injection of which may bring about the cure of the cow.

67. REGULATING THE DRAFT OF HORSES.— Given an even road and a car to be moved thereon, there will be a center of resistance to the motion of the car, which center will fall in the vertical plane, passing through and dividing the car in two equal parts. The relative strength of the horses being known, they should be so hitched that the moments of their forces shall be equal, then the equivalent force would be applied to the center of resistance as it should be. Suppose that one of the horses was lagging behind, then the equivalent force would not pass through the center, and theoretically it would be replaced by a force supplied to the center and by a pair of forces tending to rotate the car, which last forces will be wasted in producing friction. Therefore, to have the equivalent force always apply to the center of resistance, some kind of dynamometer must be installed to indicate this somewhat imperceptible lagging. Furthermore, some mechanical and automatic means could be associated with the dynamometer for tackling in some manner the hind legs of the lazy horse. These things, however, await the inventor.

68. VENTILATING STREET CARS.— The closed street car, although usually provided with means for ventilation in the roof, the same is not within easy reach of the passengers and is more often closed than open. In these days, however, the construction of street cars has become a matter in which the public have a voice through regulations inforced upon the car companies. It is admitted that the proper point for ventilation is at the top of the side windows, which would bring the opening above the heads of the passengers and be where the passengers could readily secure the ventilation in a crowded car. Various ways can be found for manipulating the window so as to admit fresh air at the top and at the same time keep out the weather.

69. TYPEWRITER IMPROVEMENT.—Considerable time is required in underscoring on a typewriter, and some simple arrangement is needed by which the uderscoring will take place while the line next below that underscored is being written. Such an improvement should be of value.

70. SELF STARTERS FOR AUTOMOBILES.—For some time considerable ingenuity has been applied to the production of self-starting devices for automobiles, but it has only been recently that these devices have reached such an embodiment that their use will be popular and inexpensive. Some of the devices being used are quite satisfactory while others are not. The automobile field is so large that good inventions along this line are very much demanded.

71. SHOCK ABSORBERS.—More attention than ever is being paid to these devices on account of the general increase in their employment. The automobile has required the production of special devices to meet the need of severe shocks, and the dash-pot principle is to be found among the effective devices, which principle is simply the cushioning of the car upon air compressing within the dash pot. It will be worth the efforts of inventors to provide against the effect of the smaller vibrations to which vehicle traffic is subject.

72. ROAD BUILDING.—Over fifty years ago one by the name of MacAdam took out a patent on a road built from broken stone, and, until lately, this type of road, called macadamized, has been in great favor. To-day, under the new conditions of use, they are being condemned as too expensive, considering their rapid wearing out and constant need for repairs, and it is recommended that it is cheaper in the long run to build roads of solid concrete. Road builders are looking for some middle ground between the Macadam road and the Concrete road. The gravel road is one of the cheapest and, considering the cost of building and maintenance, one of the best. If some binder, having about the quality of cement, could be found to use with gravel, a permanent road construction would doubtless result. 370 miles of water-bound Macadam road cost New York State at an average $10,813 a mile; 830 miles with bituminous binder cost $10,986 a mile.

73. INCANDESCENT MANTLES FOR GAS BURNERS.—These mantles when put into use instantly become an ash when once subjected to the flame. They are so frail that they frequently break into pieces under the slight explosion of the gas when lighting. It is quite a difficult problem to find a material that will make a tough white ash and take on an incandescent glow, but such is much desired and its discovery will be numbered among modern day achievements.

74. TOYS AND GAMES.—Germany is considered the home of toys, and each year she is getting out new toys that find a ready market all over the world. The toy as a means of profit should commend itself to the inventor. Those toys that are capable of self-movement are in demand, as well as those which make a call on the mental powers of children, as in assembling some toys or solving the problem toy. Puzzles, on account of their novelty, if of sufficient cleverness, make good sellers.

75. THE CHEAPENING OF ALCOHOL.— Alcohol is ideal as a fuel, and its more general use as such and for many other purposes only awaits its further cheapening. Of late, it has come to notice that in the distillation of alcohol the refuse, consisting partly of fusel oil, is on the way to become the chief product and the alcohol the by-product, because it has been found that the isoprene, one of the constituent products of fusel oil, is now cheaply converted into a substance said to be identical with India rubber. This circumstance should tend to lower the price of alcohol, but whenever alcohol is distilled from wood, its price is 40% under that distilled from other material, and contains no fusel oil but only ethyl-methyl and acetic acid, and the rest are solid hydro-carbons. Some Frenchmen claim that they can use solid hydro-carbons for feeding cattle, but it is hardly to be believed because in this residue there is no nutritive. If a means were found to utilize the solid hydro-carbons resulting from the fermentation and distillation of wood alcohol, that product would be materially cheapened. These solid hydro-carbons can be burnt to a charcoal, thus obtaining carbon that may be of use for electrical purposes. These solid hydro-carbons can be cheaply bought from the distilleries or laboratories.

76. ABDOMEN REDUCING BELT.—There are a number of persons advertising extensively to reduce a person's weight without medicines or exercising, and it is soon found that the means employed to reduce weight is the obesity belt, a simple form of belt for abdomen on which a number of patents have been granted. It is well recognized that these belts, by their contraction about the abdomen and the involuntary massaging that the abdomen is given by them, is productive of wonderful results in causing the disappearance of much of the fatty tissue and the bringing into exercise of the abdominal muscles to cause the natural restraining and positioning of the abdomen. Any simple form of belt produces some marked result in reducing the abdomen, but inventors have devised elastic forms of belts with the abdominal portion so formed that the flesh is caught mildly by it, and thus massaged from the movements of the body. One form of belt very largely sold has two sections of coiled wire, which act as the massaging element. Here is an art developed in a primitive way and well proven that should invite the attention of the inventor, for it stands to reason that the obesity belt with its abdomen reducing properties can be greatly improved upon. Comfort to the wearer is an important desideratum, and the inventor who undertakes this art should devise a massaging portion that will not unpleasantly support the abdomen.

77. TROUSERS STRETCHER.— Various devices have been made and patented for preserving the shape of trousers when not being worn, but it is matter of remark that these devices that are really effective in holding the trousers under a stretching tension require some effort of manipulation that makes them generally undesirable for use. What is needed is a stretcher permanently located in the wardrobe, or upon the wardrobe door, into which the trousers may be quickly positioned and placed under the tension of a strong spring. Such a permanent and readily manipulated device would seem to supply a long existing demand.

78. SPIKES FOR SECURING RAILS TO THE TIES.—The present form of spike used in the construction of railways is found to work loose under the travel thereon, and to be the cause of many accidents. There are forms of spikes which are capable of firmly retaining themselves in the tie but which are more difficult of application, and which bring about mutilation of the tie when withdrawn. The screw principle would be ideal if a screw spike could be quickly applied and removed, but with many known expedients inventors should be able to meet conditions involved in this need and supply a spike that will go far ahead of that used today.

79. SPREADING OF RAILWAY TRACKS.—In the railways of England, it is understood, a much better construction is practised than in the United States, in that the rails are provided with a supporting brace or chair at each tie. This construction is expensive, but it goes very far to prevent the spreading of the rails. In the United States, with the continually increasing weight of the locomotive and the cars, some provision is imperatively needed to tie the rails together against spreading. Inventors in taking up this problem would do well first of all to study the actual conditions, and familiarize themselves in a general way as to what has been done. The item of cost is important to railroads, and the successful plan of construction should not materially increase the present cost.

80. ICELESS REFRIGERATION.—In Mexico the Senorita is seen swinging a porous jar containing water in order to cool its contents by evaporation. Today this principle of evaporation as a means of producing cold has been developing an art of, what may be termed, iceless refrigeration, and refrigerators are on the market which produce a substantial degree of cold suitable for the general preserving of food by reason of low temperature and ample circulation of fresh air. This art, however, is in its infancy, but bids fair to be developed to a point when ice will not be a necessity. Experimentation can be practiced by anyone, and once the principle is grasped that by the evaporation of water and free circulation of air cold can be produced, the inventive mind will seek to multiply results and will outdo those at present accomplished.

81. KEYLESS LOCK.—There are locks of the combination type, which are keyless, but these are generally of a complicated and expensive structure. What is desired in order to do away with the trouble caused by losing a key, is to have no key, and provide for the operation of an ordinary lock by some simple means that can be operated only by one knowing the secret of manipulation. Here, as in most cases, the successful trick will be in simplicity and practicability.

82. PARCEL POST SHIPPING DEVICES.—The inauguration of the Parcel Post by the Government has opened up a new field for inventors in making a demand for light weight containers that will effectually prevent breakage of the various articles sent by parcel post. The egg crate is one of the containers that taxes ingenuity, but is at the same time an important and much needed device. In the shipping of eggs each egg should be supported free of the other and against shock as much as possible. The problem is not a difficult one, and the difficulty that does exist is in making the construction of very light weight. Spring wire can be successfully used for supporting the eggs.

Bottles containing liquids require an enveloping package that will meet postal requirements, so that in case of breakage mail will not be damaged. These are but a few of the many situations made by the new Parcel Post law that are fruitful for the inventor, and he is recommended to investigate all of them with a view to successful and proper invention.

83. CREAM SEPARATORS.—In the cream separators now upon the market one sees a wonderful result in the application of centrifugal force, as by the rotation of the rotating container the milk, which is gradually being fed thereto, is caused to separate from the cream by reason of being heavier, and is, therefore, carried to the outer circumference of the container, while the cream remains near the center of motion, each being drawn off from a suitable point of accumulation into different receptacles. The greatest criticism or complaint in these devices is in the number of parts which one is required to keep clean, and which require time in assembling and taking apart. There is nothing difficult involved in this art as production of centrifugal force at a high rate of speed is the essential feature. An efficient apparatus of this character will ultimately be made for $5 when the inventors of the country know more of the art and the opportunity it affords.

84. MECHANICAL MILKERS.— The old-time prejudice to the mechanical milker, to the effect that injury occurred to cows from their use, is fast disappearing with recent day improvements of the milker. These devices are substantially pumps which produce a suction upon the teats. The continued suction was found to be bad, and an intermittent suction was substituted. It is claimed of some of the present day milking machines that they simulate the action of the calf in nursing, but it is contended by some that the action of the calf is similar to the squeezing of the hand in handmilking. If this is true, then inventors should seek to imitate the hand's action in milking without suction, and this should not be difficult in a mechanical way, as by a tube made to intermittently contract and relax about the teat, the contraction occurring first at the top and continuing downward.

85. RECEIVERS FOR WIRELESS TELEGRAPHY.– Those acquainted with this subject realize how faint is the receiving impulse in wireless telegraphy, which makes necessary the ear pieces for their detection. Considerable improvement in this art will be made when the present slight impulses at the receiving end of the wireless apparatus can be made to operate some means such as a telegraph sounder. The problem is very much like that which confronted Berliner when he invented the transmitter of the telephone, and which multiplies results so that a few miles range of usefulness of the telephone was extended to hundreds of miles.

86. PACKAGE TIES FOR MAIL MATTER.—The United States Postoffice at Washington, D. C., has been trying for a number of years to find a simple and convenient tie for holding the cord which passes around packages to be mailed. The purpose is to save the cost of cord, which previously has been used for tying packages and which is destroyed after it has been used once. Many devices have been used for holding the ends of the cord, but the Department appears to be inclined to want something still better than the devices now in use. To meet official requirements a package tie must be small, not cumbersome, and which will lie close to the package and at the same time will securely hold the ends of the cord and permit the same cord to be used over and over again. Some ingenious inventor will get up a device for the purpose referred to and will incidentally make a tremendous fortune.

87. NECKTIE SUPPORTERS AND STRETCHERS.— There is a real need and demand in the market for a simple and convenient device for holding gentlemen's four-in-hand scarfs and other ties in proper condition, so that a man may select the one wanted and find it in proper condition for use. In looking for a device of this kind at the stores it will be found that nothing better than a ring of some kind to support the tie can be found. This device serves the purpose of supporting the tie, but does not stretch it and take out the wrinkles. Well-dressed gentlemen regard it fully as important to have a nice, smooth four-in-hand scarf to wear as they do to have their trousers stretched, or any other article of apparel in proper condition. A simple device for the purpose referred to would find ready sale and the inventor should do well with it.

88. SANITARY DEVICES.—In these days while there is so much agitation in the matter of pure food, there is a crying necessity for many sanitary devices. In the various lunch rooms, coffee houses, and similar places it is very desirable to have such articles as sugar, butter, and the other accessories to a table properly protected from flies and from being handled by the customers that come in who do not use the articles, particularly in the matter of sugar. Usually cut sugar is to be found in a large bowl upon the counter. Persons coming in will pick up one or more of these pieces of sugar and will handle a great many others. This practice may lead to the spreading of disease, and is uncleanly to say the least. It would seem that a little thought by an ingenious inventor would devise many little improvements which would not be expensive and which would find ready sale in the market, especially to coffee houses, restaurants, eating-houses and other places where food is displayed on a counter and is liable to be contaminated in some manner, either by flies, roaches or by the handling of persons coming into such places. It was this same character of improvement which was devised by the National Biscuit Company to prevent the handling of crackers in grocery stores. It will be seen that a sealed package of crackers would lead to cleanliness and render them more saleable and at the same time insure a sanitary package to the purchaser. It would seem to be a profitable field for the inventor who has a taste for cleanliness and sanitation.

89. DIRECTION INDICATOR FOR AUTOMOBILES AND OTHER VEHICLES.—Good automobile inventions always prove of great value to the inventor. There seems to be a need for a direction indicator for automobiles to be displayed from the rear end of the vehicle. In crowded thoroughfares it is very often desirable for the vehicle in the rear of the automobile to know which way the automobile intends to turn—to the right or left. It is also equally desirable for pedestrians to know which way the automobile intends to turn at the coming corner. A device to be desirable and saleable should be able to indicate the direction in which the driver intends to turn at corners or curves, and this device should be seen as readily in the night as in the day. There are very few devices of this character to be found in the prior art in the Patent Office, and they are mostly complicated and do not meet the popular demand. A device to be saleable should be automatically operated from the steering wheel, so that if the vehicle is to be turned to the right the device at the back and front of the machine would indicate the direction.

90.—MOVING PICTURE INVENTIONS.—The moving-picture art has been greatly improved within the past few years, but notwithstanding this fact the projector for the picture is located in the front of the theater and the pictures are projected over the heads of the audience. This would be all right were it not for the fact that in case of fire the auditors are penned in and can not get by the fire zone. It would seem that some means could be devised whereby the projector could be located in the rear of the screen, thus giving the audience a chance to escape from the building in case of fire. There have been a great many disastrous fires in picture-show houses. Nearly every one of these could have been obviated were the projectors located in the rear of the screens. Fire authorities of nearly every city could be induced to include a fire regulation making it necessary for the projector to be located behind the screen, if any good invention of this character could be proposed.

91. JEWELRY DESIGNS.—The art of designing jewelry is a very lucrative field for inventors whose minds run in this particular direction of art. Jewelry manufacturers find difficulty in finding designs for various pieces of jewelry which will meet with the approval of a discriminating public and which will find ready sale. These designs are used in all classes of jewelry, and design patents may be obtained for three and a half, seven or fourteen years. The inventors in this particular art are able to get good, round sums for their inventions. Public taste is constantly changing, and there is always a demand for novelties. It is a fact that if an inventor can produce anything which the public wants his fortune is made.

92. BREAD WRAPPING MACHINES.—In large cities where there are thousands of loaves of bread baked and sold every day there has been considerable controversy and movement looking toward wrapping the bread so that it can be received by the purchaser in a sanitary and cleanly condition. There is a demand for a machine that will take the bread directly after it has been withdrawn from the baker's oven and wrap it in either a paper or other material which will prevent direct handling of the loaves and will permit the bread to be seen through the wrapper. A machine to meet the requirements must be rapid in action and should operate automatically, as far as possible. Large bakeries are ready to consider any device which will wrap the bread as fast as it can be turned out of the oven.

93. CARE OF LIVE STOCK.—The feeding, watering, protection, and general care of live stock should prove a very interesting field of invention for those persons having a specific knowledge of animals and pet stock and who are interested in their welfare. Persons who are fond of animals are usually interested in the matter of their protection and welfare. These are the persons who should make the inventions for their comfort and care. The field is a large one, and there is a constant demand for improved devices.

94. RAILWAY DEVICES.—There is a division of the Interstate Commerce Commission at Washington under the charge of a number of experts in devices of preventing railway accidents. These experts are sent to various parts of the country.to examine devices of all kinds looking towards rendering travel by railway more safe than at present. Any device or invention which meets with their approval has a great chance to be adopted by the railroad companies throughout the country. Devices of the kind most sought for are those which do not depend upon the manual operation of the engineer or any one of the employees of the road. In fact, automatically operating devices are the ones most in demand. This character of invention is of course difficult to conceive and work out. The persons best equipped for making improvements in this particular art are the employees of railroads, that are intimately acquainted with the cause of accidents.

95. MILK JARS.—Milk jars and closures therefor are open to many improvements, both in the manner of rendering them more sanitary and also in rendering them more easily cleaned. These milk jars are handled by milkmen after they have filled the jars, and the jars are usually grasped by the neck and carried into the houses. When the paper disk is removed from the milk jar the milk is poured over the neck. The little shoulder within the mouth of the bottle to support the disk is never properly cleaned, and there is a collection of germs and sour milk on this shoulder. There should be a better way to protect the mouth of this character of bottle and a better closure for the mouth, and one which would not require a shoulder inside of the bottle which would collect all the germs and dust flying about the street before the milk is delivered to the consumer.

96. HYDROPLANES.—The recent inventions in air ships of the aeroplane type have shown a tendency to favor that class of devices designed to navigate both in the air and on the water. Safety being one of the greatest desideratums in this art, it would seem that the hydroplane should displace many of the older forms of air ships. The obstacles to be overcome in this art are many, and they have not been wholly surmounted as yet. The features to be considered are: 1. Ascension. 2. Propulsion. 3. Direction. 4. Poise. 5. Stability. 6. Safety. Perhaps "safety" should be the first consideration, but aeroplane inventors seem to almost entirely disregard this element. In the hydroplane safety has been deemed of great importance.

97. METHODS AND PROCESSES.—A method or process may be briefly described as a step or a series of steps to be performed by hand or partially by hand and partially by machine for changing the normal condition of an article to increase its utility and value. A method or process which includes only one new step or manipulation, provided a desirable result is attained thereby, may be patentable. Bessemer, the inventor of the steel known by his name, produced that superior product by projecting a blast of air at a stated moment into the molten iron mass to convert it into steel. This step was patentable, and its value is inestimable. A patentable method may have for its purpose the production of an old article in a new and expeditious manner; or the production of a new result by a slight change in sequence of the steps usually performed in producing a well-known article. Process patents are usually quite broad and comprehensive, since they cover the steps performed without regard to any specific means for performing the operation. Find a better way of doing something.

98. MOLDED CONCRETE HOUSES.—There has been recently quite a movement in this class of invention, and the field is comparatively new. Mr. Thomas A. Edison believes this will prove the most durable, practically fireproof structure which can be produced. At present the art shows mold sections movable in guideways after each molding operation, and the molds themselves, as well as the means for raising them, are quite crude and open to many improvements. This is a good field of invention for builders and architects.

99. HOUSEHOLD AND STORE SERVICE FURNITURE.—In large cities, where floor space in dwellings, apartments, and store-rooms is restricted, it is found very desirable to provide furniture and fixtures which will occupy as little space as possible. Folding beds have been displaced largely by convertible Davenports, and kitchen cabinets have taken the place of cupboards and store-rooms. There is a vast field and a lucrative one in the art of economy of space. Producing folding or space-reducing furniture or articles for household or store service should be an interesting and profitable territory, rich with chances for the expert woodworker and designer.

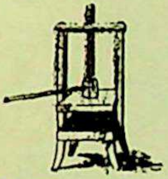
100. SMALL ARTICLES OF UNIVERSAL USE.—Great fortunes have been made in patents for little things. Economy in production of any article in constant use is a fruitful source of revenue, whether it be pins, needles, buckles, clasps, key-rings, hairpins, buttons, pens, pencils, articles of stationery, or what not. Do not despise the little things; they are as necessary as the large inventions, and are in constant and growing demand.

THINK!

Think what a great part the following nine commercial wonders of the world are playing in the prosperity which you are enjoying.

John Gutenberg

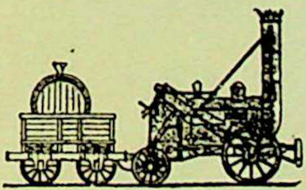
Think what Gutenberg did for civilization when he invented the movable-type printing press, and enabled the human race to educate themselves.



The First Printing Press.

George Stevenson

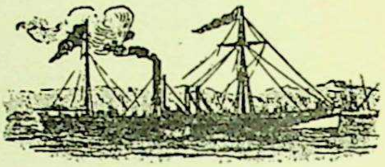
Think what George Stevenson did for the world when he thought of the steam locomotive, which made possible cheap transportation of men and goods, and has done so much for civilization.



The First Locomotive

Robert Fulton

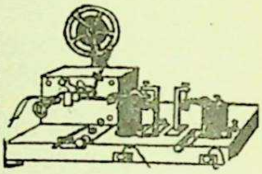
Think how Robert Fulton brought the countries of the world together by thinking of the steamboat. Transportation on sea is fast and cheap because Fulton thought.



The First Steamboat

Samuel Morse

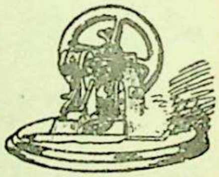
Think what Samuel Morse did for the world when he thought of the telegraph, which has annihilated distance and brought the ends of the earth together.



The First Telegraph

Elias Howe, Jr.

Think of what Elias Howe, Jr., did for millions of women when he thought of the sewing machine—one of the greatest blessings to the human race



The First Sewing Machine.

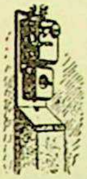
C. H. McCormick

Think what C. H. McCormick did for the world when he thought of the harvesting machine. The nine-billion-dollar crop of today would not be possible without it.

The First Harvesting Machine.

Alexander Graham Bell

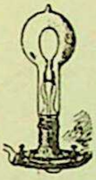
Think what Alexander Graham Bell did when he thought of the telephone, which enables you to talk hundreds of miles, expediting business and bringing your social friends within sound of your voice.



The First Telephone

Thomas A. Edison.

Think what Thomas A. Edison did when he thought of the incandescent light, and his other electrical appliances, and how they have facilitated business and added to the comforts of the home.



The First Incandescent Lamp.

Jacob Ritty

Think what Jacob Ritty did for the world when he invented the cash register. It is saving time and money in stores all over the world, and benefiting millions of people.

The First Practical Cash Register

THINK

of the amount of capital, and the millions of profits that have been produced by the development of these nine inventions.

B. F. LITSINGER, PRES. O TRUMAN PEARRE, SEC. & TREAS. H. M. DOLFIELD, VICE PRES.

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BALTIMORE, MD.

MESSRS. RANDOLPH & CO.,
WASHINGTON, D. C.

Gentlemen:

We are looking for something new and we need the advice and aid of your firm in placing us in touch with your intelligent clients, who are capable of helping us out.

We make signs for firms rated in the millions, and you might say by the millions. Our sign business extends over the entire United States, and we are always looking for names to trade-mark for our customers. We want trade-marks for almost everything that is advertised by the means of signs, such as Cigars, Tobacco, Whiskey, Soap, Bread, Pies, Ice Cream, Soft Drinks, Patent Medicines, Candies, in fact, names for most anything that is sold, by means of advertising, for which signs are made. Good names by the wholesale are what we want.

Manufacturers are constantly increasing and adding to their new products. They need signs and names and depend upon us for both. What is wanted, first, is a good name for a Bread, Pie or Ice Cream, or a new brand of Whiskey or Beer. Who can think of a catchy one? We will trade-mark it, and pay a prize of $25.00 for any name accepted for use by us. Here is $25.00 for a thought, can you help us to it, or do you know of one already trade-marked that could be bought outright?

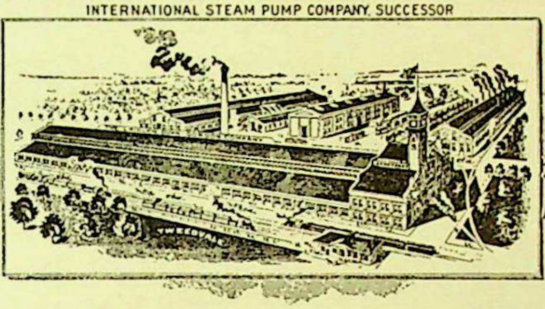
Many concerns have spent thousands of dollars to push their products without first realizing the importance of securing a trade-mark. We have several customers now suffering from great loss by reason of imitations where demand has been created without adequate protection, and the imitators or commercial pirates are appropriating the results of hard work and large advertising. Our plan is to protect all good names selected by us, for our customers who may be placing new brands upon the market, by taking advantage of the trade-mark laws for mutual benefit. Hence, our prize offers to those who can supply new ideas and names that are catchy and worthy of such protection.

As to our financial standing and responsibility we refer you to the Canton National Bank, of this city, as well as Dun and Bradstreet Mercantile Agencies.

Very truly yours,
BALTIMORE SIGN CO.,
B. F. LITSINGER,
Pres.

QUOTATIONS ARE NOT BINDING AFTER SIXTY DAYS FROM THEIR DATE
ALL AGREEMENTS MADE CONTINGENT UPON STRIKES FIRES, ACCIDENTS OR CAUSES BEYOND OUR CONTROL
PROPOSALS ARE NOT BINDING UNTIL APPROVED IN WRITING BY AN EXECUTIVE OFFICER OF THE COMPANY
THE COMPANY WILL NOT BE RESPONSIBLE FOR ANY LIABILITY INCURRED WITHOUT WRITTEN APPROVAL OF AN EXECUTIVE OFFICER

THE LAIDLAW-DUNN-GORDON CO.
INTERNATIONAL STEAM PUMP COMPANY, SUCCESSOR



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AND
AIR COMPRESSORS.

ELMWOOD PLACE, *Cincinnati, Ohio.*

ADDRESS ALL COMMUNICATIONS TO THE COMPANY

SUBJECT TO ABOVE CONDITIONS

RE;- RANDOLF & CO. - PATENTS. MR.

Dear Sir;-

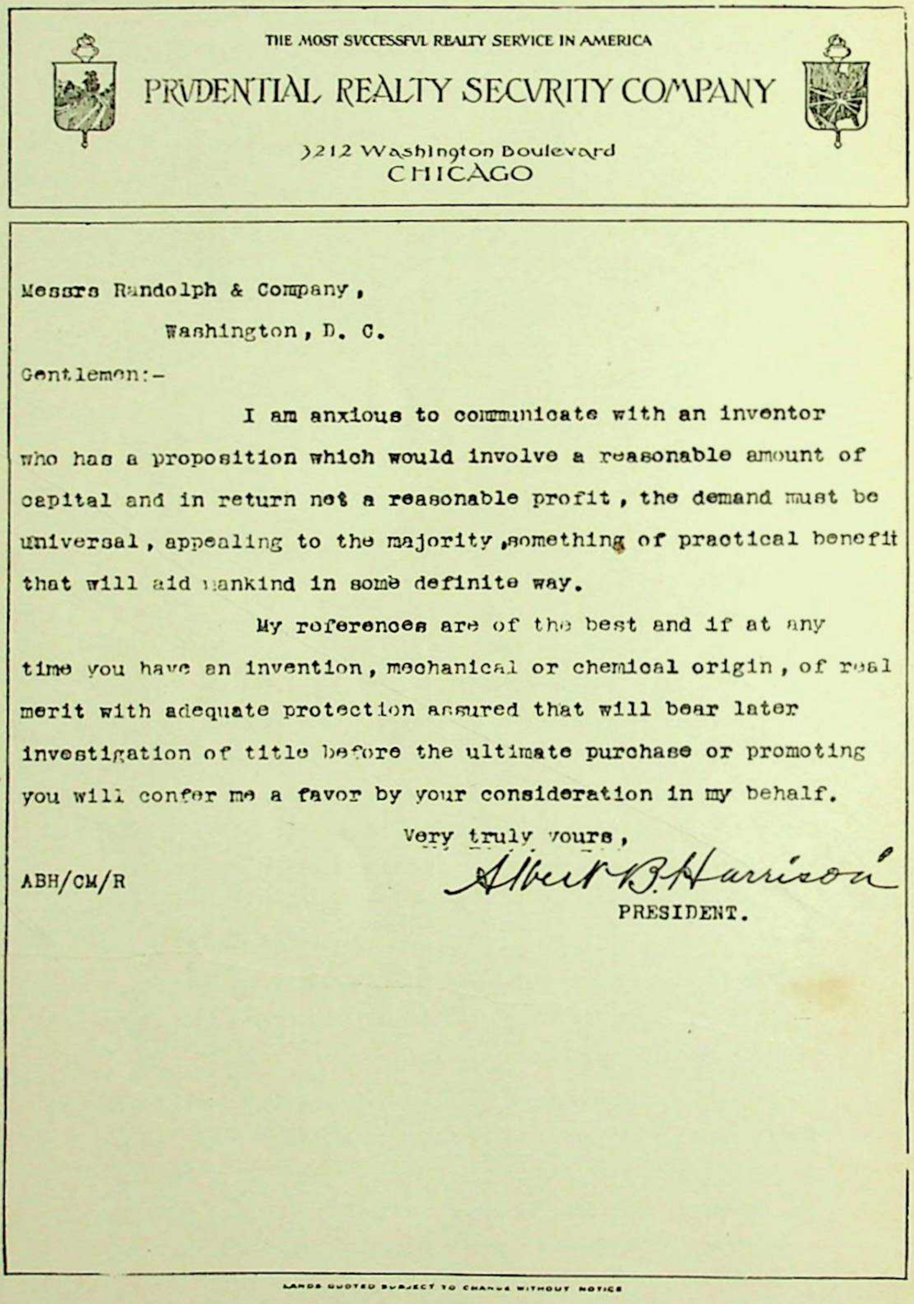
In accordance with our conversation of this morning with reference to patents of devices required, we would suggest a simple effective device to prevent oil from running along the shaft from the bearing. The usual method is to use an oil ring which, if made part of the crank shaft on the engines, makes an expensive machine operation, and if a split collar is used, same interferes with the eccentric. We have tried a small device consisting of a small bar of brass held against the shaft by means of a spring bolted on the side of bearing, the object being to wipe off the oil as soon as it leaves the bearing, but do not know just how effective this will be, as we have only placed it on a very few machines.

We understand that you act only as agent and call the manufacturer's attention to suitable inventions, and that we are under no obligations to your firm unless patented devices are accepted. We would be pleased to inform you from time to time of any requirements which we have in mind.

Yours truly,

THE LAIDLAW DUNN GORDON CO.,
M Riesner
Chief Engineer.

HWG



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3212 Washington Boulevard
CHICAGO

Messrs Randolph & Company,
Washington, D. C.

Gentlemen:-

I am anxious to communicate with an inventor who has a proposition which would involve a reasonable amount of capital and in return net a reasonable profit, the demand must be universal, appealing to the majority, something of practical benefit that will aid mankind in some definite way.

My references are of the best and if at any time you have an invention, mechanical or chemical origin, of real merit with adequate protection assured that will bear later investigation of title before the ultimate purchase or promoting you will confer me a favor by your consideration in my behalf.

Very truly yours,

ABH/CM/R

Albert B. Harrison
PRESIDENT.

LANDS QUOTED SUBJECT TO CHANGE WITHOUT NOTICE

Fred H. Vander Heyden,
BRICK MANUFACTURER

IONIA, MICH.

Randolph & Co., Washington, D. C.
Gentlemen:

I have power and buildings here suitable for manufacturing. Am looking for article to make that can be worked into a good business. What can you do for me.

Yours truly,
F. H. Vander Heyden.

A. E. KENDALL
SAGINAW, MICHIGAN

Randolph & Co., Washington, D. C.
Gentlemen:

I am looking for cheap and medium priced tools and hardware specialties which I can manufacture for the jobbing and large department store trade, and will appreciate names of such of your clients who have meritorious articles for sale or who will license them on royalty basis.

I am experienced in the sale of hardware, tools, and mill supplies, and am interested only in practical devices, not caring to waste time on freak or complicated inventions.

Thanking you in advance for early consideration, I remain,

Yours truly,
A. E. Kendall

Genesee Road, Saginaw, Mich.

TACOMA, WASHINGTON.

Randolph & Co.,
618 F St., N. W.,
Washington, D. C.

Gentlemen:

I desire to thank you very heartily for your good work in securing patent for me on an invention in Artificial Fish Bait, and will state that you have lived up to all of your promises, and I have no hesitation in recommending you to anyone desiring the services of a thoroughly competent, honest, and trustworthy patent attorney. In short, you may use my name with any recommendation that you may see fit, as I am ready to subscribe to any statement that you may make as to your ability and business qualifications.

Very truly yours,

R. A. LAMBERT.

SPOKANE, WASH., August 6, 1913.

Randolph & Co.,

Dear Sirs:

I received the papers for patent No. 44406, and am very well pleased with the way you have taken care of my business, and you can rest assured of all business of mine in the future and a recommendation to any one looking for competent patent attorneys.

Yours truly,

F. C. HOWARD,
E. 3607 8th Ave.,
Spokane, Wash.

CHICAGO, ILL., July 26, 1913.

Randolph & Co.,
Washington, D. C.

Dear Sirs:

The Patent papers were received this A. M. The work is very complete and satisfactory. You will receive further business from me. I thank you very much for your faithful attention to these matters.

Yours very truly,

(Signed) KARL W. SONNTAG.

JULY 14, 1913.

TO WHOM IT MAY CONCERN.

I would recommend Randolph & Co., of Washington, D. C., to any inventor wishing the services of a patent attorney as a trustworthy and reliable firm. Business placed in their hands by me has been carried through with thoroughness and dispatch, giving perfect satisfaction.

Yours truly,

C. M. WALTON,
32 Lowell St.,
Rochester, N. Y.

NATIONAL CAPITAL PRESS, INC.

THE LAST WORD

IF WHAT has been said in this book has convinced you that the firm of Randolph & Company knows the patent business thoroughly from start to finish, you may be further interested by the knowledge that we make it our business to do the following things so far as is humanly possible:

To tell you whether or not your invention is probably patentable.

To prepare applications for United States Letters Patent carefully and thoroughly after the necessary search.

To procure for the inventor the best and broadest patent possible.

To prepare applications for patents in foreign countries and to prosecute them through special correspondents of high ability.

To put the inventor in touch with the manufacturer or capitalist who is looking for that particular invention.

To attend thoroughly to all business relating to the registration of trade-marks, labels, prints and copyrights.

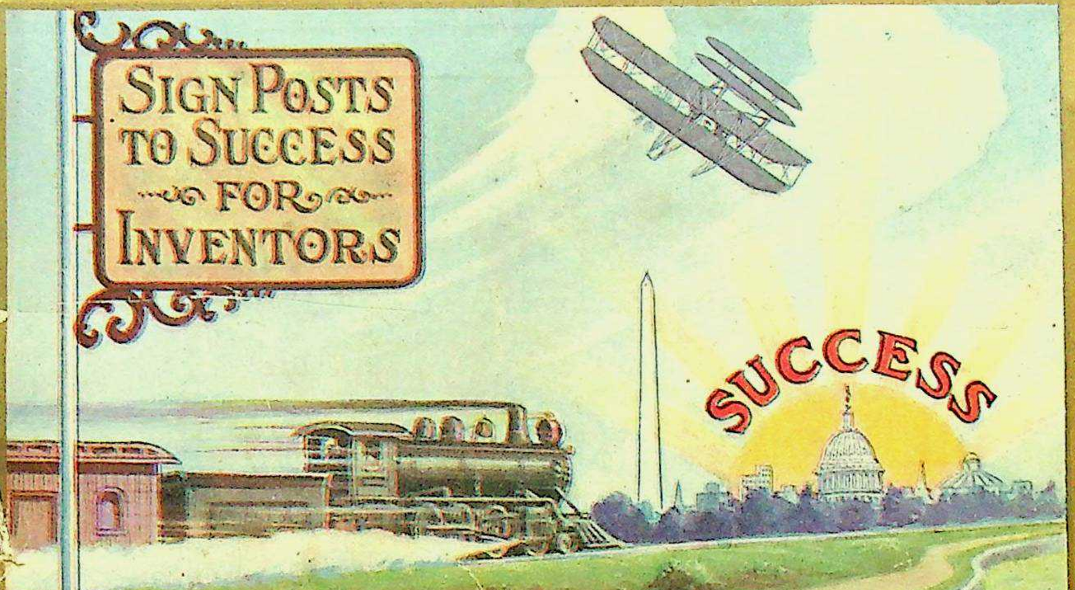
To prepare deeds of assignments, licenses, territorial and shop rights, and record same.

To prosecute and defend actions for infringement.

To make searches and report as to the validity of patents. Also make searches and give opinions on infringement questions, and make title searches and issue abstracts and certificates of title to patents, trade-marks, etc.

INVENTIONS NEEDED

SIGN POSTS TO SUCCESS FOR INVENTORS



RANDOLPH & CO.

PATENT ATTORNEYS WASHINGTON, D.C.